A Chilton Publication

The Iron Age

NATIONAL METALWORKING WEEKLY · SEPTEMBER 9, 1954

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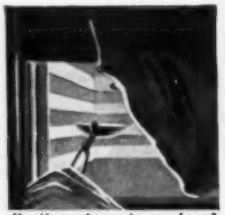

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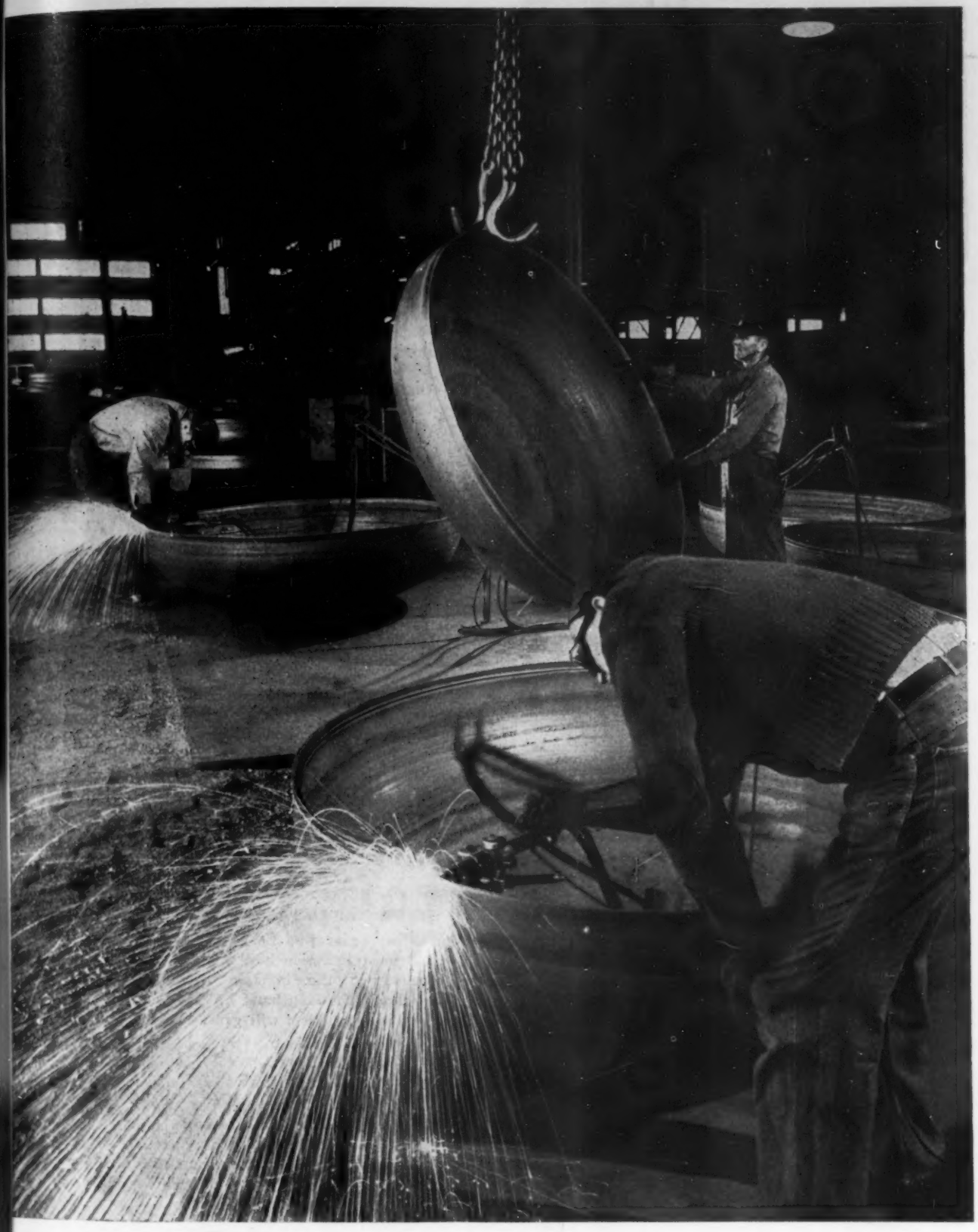

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the Iron Age

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Vol. 174, No. 11, September 9, 1954

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NEWS DEVELOPMENTS

CAMERAS HELP SOLVE ENGINEERING PROBLEMS—P. 75

If you can't figure it, photograph it. Operating high speed cameras, industrial photographers are prying into operation of combustion units, welding machines, high speed stamping and forming machines, blast furnaces. Engineer-photographer combination is bringing to light some tightly locked secrets of industry.

DRILL BELCHER ISLAND IRON ORE DEPOSITS — P. 76

Large iron ore deposits were discovered on the Belcher Islands in Hudson's Bay some 40 years ago. Now diamond drilling program is being undertaken to prove extent and quality of the iron ore holdings.

TACONITE GAMBLE STARTING TO PAY OFF — P. 78

Reserve Mining Co. is ready to cash in on its estimated $180 million investment in taconite beneficiation facilities. The Babbitt, Minn., mine and processing plant is now complete, and work is well along on the nearby Silver Bay plant. Plans call for 10 million annual tons capacity by 1970 at total cost of $350 million. Erie and Oliver Mining projects are underway and should hit 10 million annual tons capacity each, bringing total cost to over $1 billion.

STAMPING IDEA PACES FIRM'S FAST GROWTH — P. 81

Sahlin Engineering Co. furnishes good example of how fast an automation idea can grow. After a solid background in the stamping industry, Henry Sahlin developed the iron hand in 1940, formed his company 7 years ago. Firm will gross over $1 million.

WHAT'S YOUR IQ ON ATOMIC ENERGY DATA?—P. 83

A lot of people who ought to be interested in atomic energy have been scared away by misconceptions on security. New atomic energy act reflects government policy by directing more information be declassified and made public.

PERSONAL INCOME UP DESPITE RECESSION — P. 93

In spite of the business dip personal income so far in '54 is running $200 million more than in '53. Wage and salary losses in manufacturing industries have been more than offset by the rise in employee earnings in service, wholesale and retail industries; higher interest, dividend payments; increased unemployment insurance benefits.

IN METALWORKING

ENGINEERING & PRODUCTION

STRESS-CORROSION CRACKING PREVENTED — P. 123
Susceptibility of some aluminum alloys to stress-corrosion cracking can often be eliminated by removing one of the conditions, either stress or corrosion, which leads to failure. Where stress conditions cannot be altered, parts must be treated to protect the metal from corrosion.

POWDERED METAL ELECTRODES AID WELDING—P. 126
Welds of good quality at lower overall cost substantiate early claims for powdered metal electrodes. The electrodes, usually classified as E-6012, E-6020 or E-7020, have been approved by some regulatory bodies. The electrodes are recommended for use on auto parts, boats, truck bodies and similar assemblies.

SAFETY FIRST IN RADIOGRAPHIC INSPECTION—P. 128
Quality control in the production of a variety of castings is aided considerably by radiographic inspection. Equipment placed overhead, underground and outside of room removes radiation hazard to personnel, permits greater utilization of floor space.

STANDARD COST SYSTEM PINPOINTS LOSSES — P. 131
A standard cost system, used successfully by one forge plant, shows money lost by operating below capacity, pinpoints the responsibility for excessive costs and gives management the means to reduce costs.

DUCTILE IRON GIVES VERSATILE SERVICE — P. 135
Ductile iron's unusual combination of desirable qualities including excellent castability, high tensile strength and high notched fatigue endurance have subjected it to many new and unusual applications. Many heavy duty parts have been successfully produced from this metal.

MARKETS & PRICES

CONTRACT TOOL & DIE SHOPS OFF 10-12 PCT.—P. 80
Dollar volume of contract tool and die industry is expected to reach about $700 million this year. This would be about 10 to 12 pct less than last year when the boom carried many firms to new highs.

MACHINE TOOL SHIPMENTS OFF $100 MILLION — P. 107
With only slight help from foreign customers (8.3 pct) and from dwindling U. S. Government purchases, shipments of machine tools still totalled $538.4 million for first 6 months of '54. This compares with $639.6 million in first half '53 and $551.7 million in second half of '53. Builders hope tax bill helps.

STEEL RECOVERY HITS TEMPORARY DELAY — P. 179
Recovery in steelmaking has run into a temporary delay due to labor trouble and the Labor Day holiday. Wildcat strike in the Cleveland openhearth shop of Republic Steel halted production there late last week, and production is generally held back this week by the holiday. But gradual improvement in order volume will be followed by gains in production.

STEEL PRODUCTS GAINED DURING AUGUST — P. 181
Although August was a poor month in the steel industry, a check of individual producers indicates that business was better than it was in July. Most product markets are now on dead center waiting for a nudge from auto companies who must soon start buying steel for new models. Outlook for bars and sheets is a little brighter, but structurals might ease a bit.

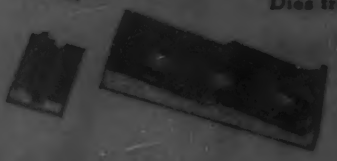
GSA TO BUY MORE DOMESTIC LEAD, ZINC — P. 182
General Services Administration is seeking additional offers of domestic lead and zinc for stockpiling programs. But the agency denies reports that it immediately accepted first offerings in response to last week's request. Tonnages are unrevealed.

NEXT WEEK:

WIDE USE OF STUD WELDING LOWERS TOOLING COSTS
Productivity has been nearly doubled while simultaneously reducing tooling investment through the use of stud welding. Elimination of corrosion problems, simplified assembly and less use of expensive jigs and fixtures are further advantages. Carbon and stainless studs are specified.

RUSSIA HAS STRANGLEHOLD ON FINNISH ECONOMY
Reparations demanded from Finland in 1944 forced the Finns to borrow, set up industrial machine. Cost of production keeps Finnish industry from competing with West, channels all their output to Reds. Finns lack raw materials to enter into trade with Free World. Economy is locked in gear with Russia's.

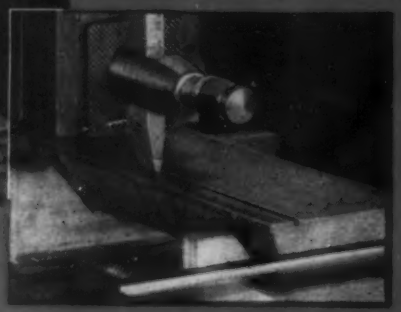
Form Tools



Dies from Templates

Facing 90° shoulders

Duplicating a Cam



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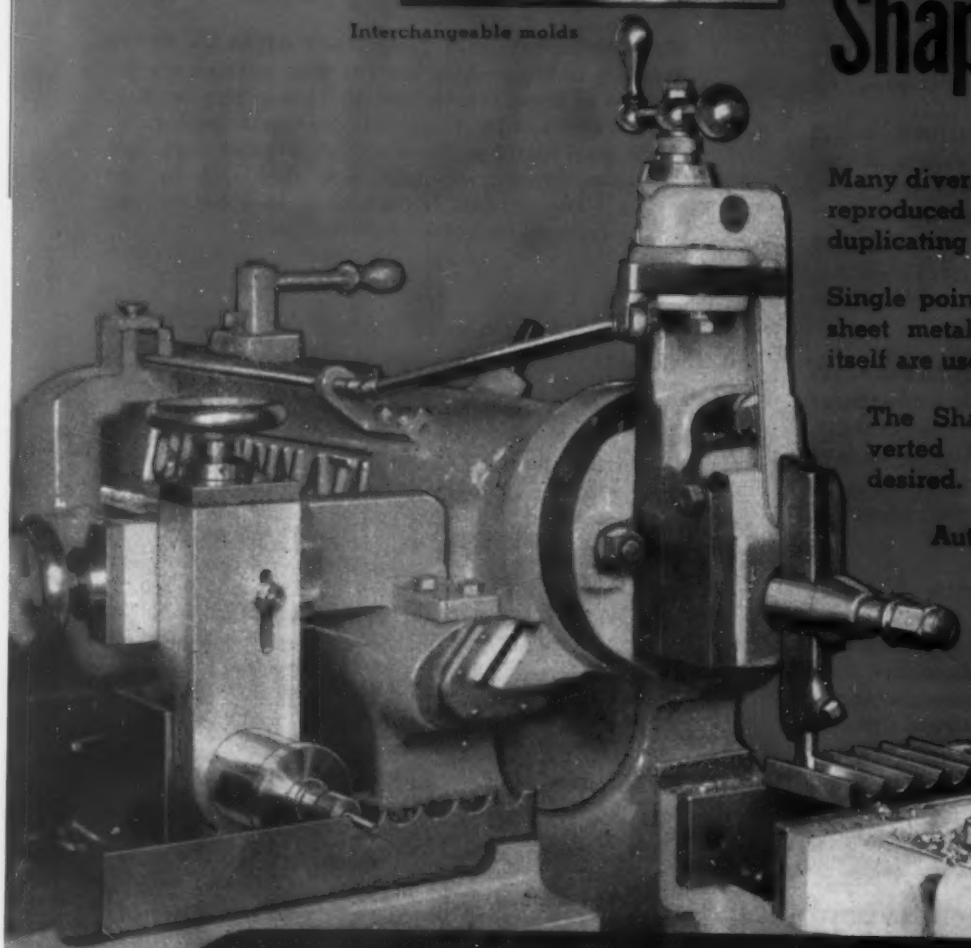
Write for Bulletin N-6.



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Indexed in the Industrial Arts Index and the Engineering Index.

ABP NBP

Editorial:

V. P. in Charge of Significance

THIS is the age of specialists. As chief executive you can't know all, see all and be everywhere. You have V.P.'s of production, sales, finance, advertising, employee relations and public relations. Listening to these people helps you to make decisions affecting your company, stockholders, employees—and yourself. It's not easy but it has to be done with few errors.

The cold war with its impact abroad and at home affects every man, woman and child in this country. Not to watch its course and correctly analyze its trends could mean the difference between a firm's success or failure.

What replaces the European Defense Community treaty may involve your firm's plans in some manner—as well as your relationship with West Germany. The loss of Japan's rice imports from Indochina may seem far afield from your loss of a Japanese industrial order but it isn't.

The passage of a Universal Military Training bill might not seem right to you—but will you sense its impact on your manpower, your products or your sales? With the "new look" getting a cold look from some defense officials, have your specialists warned you of tighter material conditions, inflationary tendencies and a halt in lower taxes?

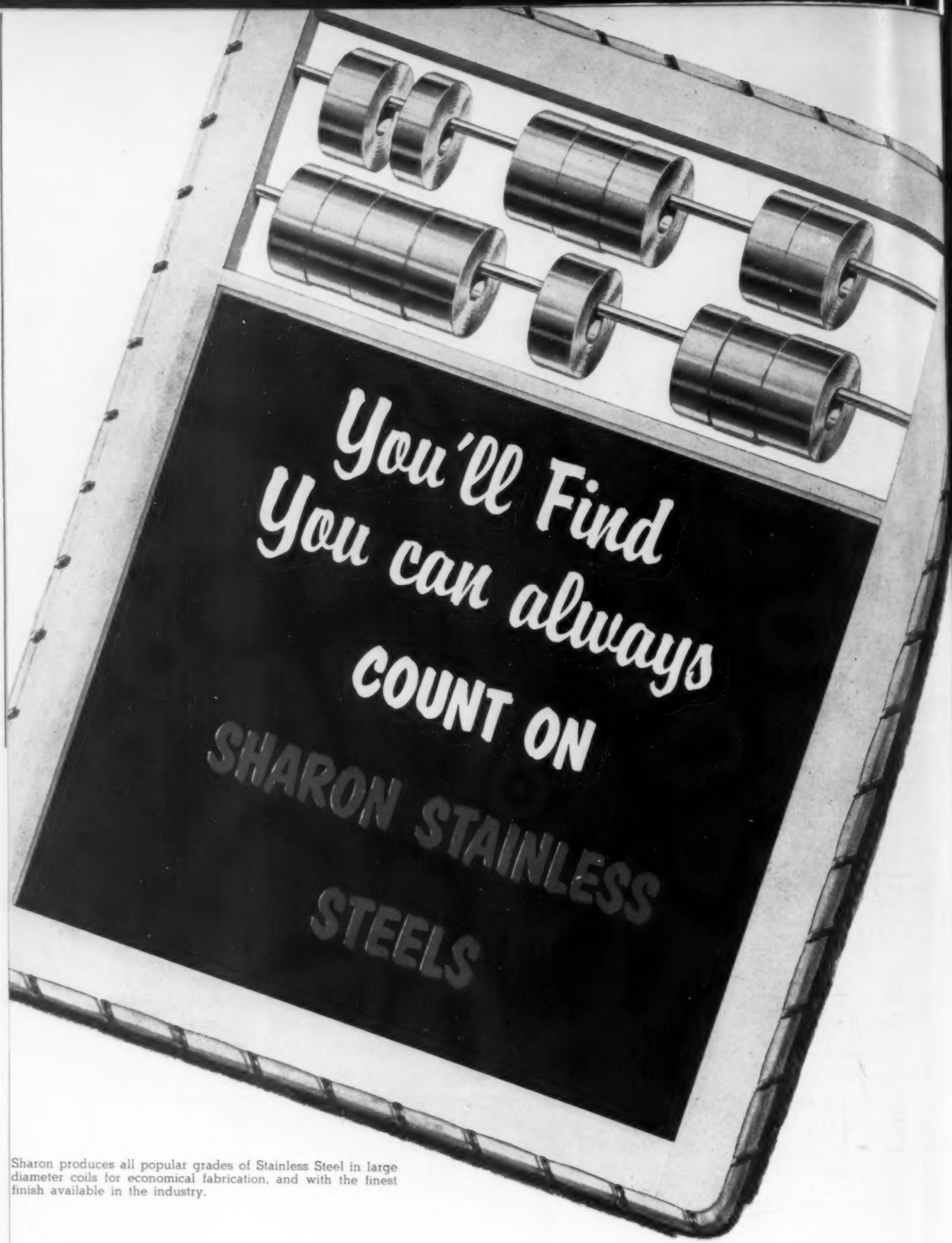
It may be time to add a new type of vice-president. He would eliminate prejudices, politics and preconceived ideas as he sifted out the real news from the welter of foreign and domestic dispatches. He would know how to quickly separate propaganda from fact; how to smell politically tinged reports, statements and speeches. But he would know his firm's products, markets and potential so he could relate cold war events to his company's outlook.

This man would have a legion of friends among newspaper people, magazine editors, administration officials and Congressmen. He would be a prodigious reader of foreign and domestic news relating to the free world's fight against communism. But he would deal in cold hard facts as they are—not as some would have them. He would be one who, looking far beyond mere news, would dig out its impact on your business.

He would be your V.P. in Charge of Significance.

Tom Campbell

EDITOR



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dear editor: *letters from readers*

Removing Titanium Scale

Sir:

On p. 65 of the Aug. 12 issue, I am interested in the reference to a specially developed process used at one aircraft plant for coating titanium metal surfaces before heat treatment to change the scale to a more easily removed form.

I would appreciate obtaining more information as to whether it is a restricted process or if not, what the coating is and its method of application. *M. W. Marshall, Sr., Research Engineer, Research Laboratories, Armco Steel Corp., Middletown, Ohio.*

More details may be obtained from Boeing Airplane Co., Seattle, Wash.—Ed.

Popular Handbook

Sir:

In reading the July 29 issue I was much impressed with the tabulated information given in your "Metal Cleaning and Finishing Handbook."

I would like to put in a request for two copies of this article for I'm sure they would be invaluable as a quick and easy reference for our work here. *W. Dralet, Jr., Supervisor, Chemical and Metallurgical Engineering Dept., Ford Motor Co., Aircraft Engine Div., Chicago.*

We have only a few hundred copies left out of our original reprint run of 5000. They are available, on a one per reader basis, as long as they last.—Ed.

Temperature Drop

Sir:

On the Newsfront page of your Aug. 5 issue there was an item concerning a ceramic material used for pressure casting with a high temperature gradient along the length of a 3 ft tube made from this material.

We would like to know where additional information on this material can be obtained. *R. C. Matter, Supervisor, Metallurgical Laboratories, Delco-Remy Div., General Motors Corp., Anderson, Ind.*

Additional information may be obtained from Electro Refractories & Abrasives, 344 Delaware Ave., Buffalo.—Ed.

Aluminum Etchant

Sir:

Please forward to us more information on the new alkaline aluminum etchant mentioned in your July 22 issue. *J. Randazzo, Purchasing Agent, Philadelphia-Rust-Proof Co., Philadelphia.*

Further details about the new alkaline aluminum etchant may be obtained from Oakite Products, Inc., 130H Rector St., New York 6, N. Y.—Ed.

Trepanning

Sir:

We are desirous of contacting the manufacturers of the trepanning attachment described on p. 120 of your Aug. 12 issue.

We would greatly appreciate it if you would be kind enough to give us the name and address of such manufacturers. *M. Takata, New York Representative, Kyokuto Boeki Kaisha, Ltd., Tokyo, Japan.*

The manufacturer is the Axelson Mfg. Co., Div. of Pressed Steel Car Co., Inc., P. O. Box 15335, Los Angeles 58, Calif.—Ed.

Metallic Insulators

Sir:

We would like to secure permission to reproduce two articles from THE IRON AGE. The first appeared in the Jan. 17, 1935, issue entitled "Heat and Cold Insulation—A New Field of Application for Sheet Steel"; the second, "Metallic Insulators Are Effective Heat-Ray Traps," appeared in the Feb. 14, 1935, issue. *R. C. A. Beisel, Sales Manager, Plant Economy, Inc., 50 Broadway, New York.*

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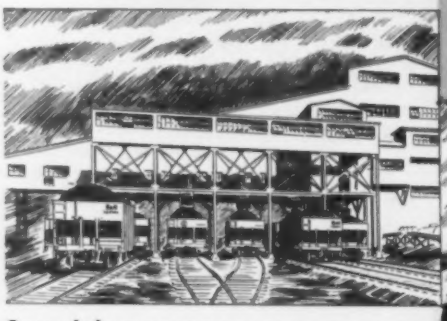

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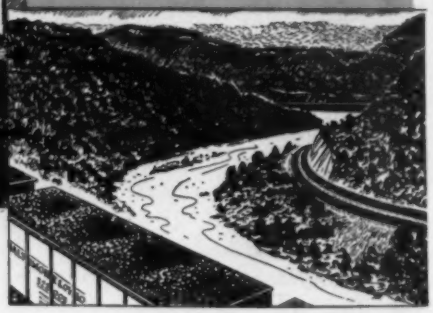
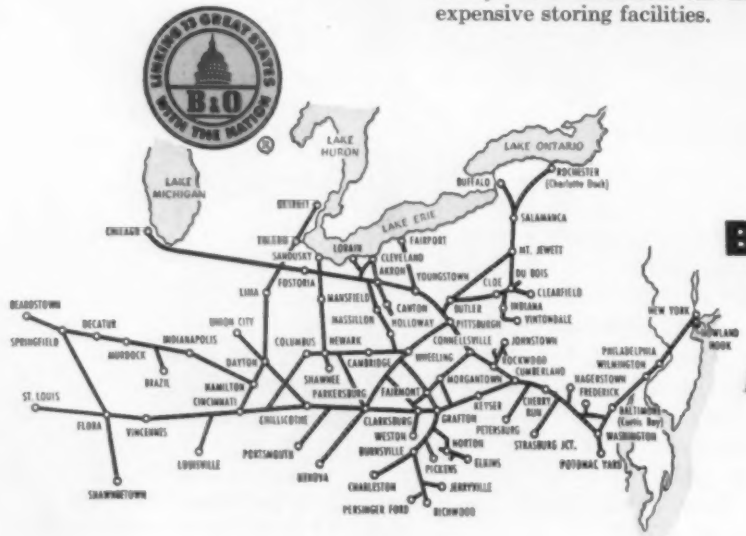


Reserves for centuries. Plants built for bituminous coal are assured a continuity of fuel supply regardless of emergencies. On the B&O alone, are reserves estimated at 25 billion tons!



Baltimore & Ohio Railroad

Bituminous Coals for Every Purpose

fatigue cracks

by William M. Coffey

For Random Release

It was disclosed officially today that the U. S. has ordered an indefinite quantity of items of an unidentified nature from a manufacturer located in the western part of the United States. The announcement was made by a highly-placed government official who requested that his name not be revealed.

Pressed for details, the spokesman told a jam-packed press conference that by stretching a point, he was able to say that the items are designed for passage through the air.

Asked if the manufacturer's factory was not, in fact, located in California, the official gave only a knowing wink.

Aircraft industry observers believe that today's announcement concerns a supersonic helicopter, known as the "Gone," believed to be in production at the Ajax Wheelbarrow & Airplane Works at Frostbite, Calif. Although company officials have been unable to confirm or deny the existence of the project, Ajax is believed to have been actively at work on the craft for the past 12 years.

In 1947, the official Russian magazine "Flizolkivich" printed a 24-page supplement concerning a supersonic helicopter which was described as being in production at Ajax Wheelbarrow in the U. S. The supplement included photographs, detailed three-view drawings and loft lines, and a complete set of performance curves.

(EDITOR'E NOTE: The Aviation Editor of Affiliated Press has had details of the "Gone" project since 1945. On October 17, 1949, the Affiliated Press submitted to the government a story on this helicopter, requesting permission to release the story publicly. Although facts in the story were generally known in the industry, could be ascertained from a reading of the article in "Flizolkivich," or by personal observation through the Ajax fence, to date the government has refused to release the story. In the interval since 1949, Affiliated Press has written 176 letters on the subject to the government, has rewritten and re-submitted the story 81 times at government request, and has collected a complete set of government regulations on release of security information, now totaling 11 pounds, 12 ounces.

Acute observers have noted that several hundred helicopters resembling the one shown in "Flizolkivich" are lined up against a fence at the Ajax factory, adjoining a 12-lane public highway. Small boys of the neighborhood report that their airspeed indicators are calibrated from Mach 5 to Mach 27.

In Washington, aviation circles were inclined to agree that today's government announcement referred to the "Gone" supersonic helicopter. Since 1951, the Official Compendium of Work in Progress of the Bureau of the Budget has listed Ajax Wheelbarrow as having a large government project for "unusual helicopters," under the code name "Went." The code name "Went" is believed to be a security ruse for "Gone," although some officials have referred to a Mark II Ajax helicopter, known as the "Real Gone."

..... *the above release comes from Consolidated Vultee Aircraft Corp.*

Puzzlers

Farmer Brown loaded his cattle on a raft and took them to a small grassy island off the coast of his Florida farm. A year later, when every cow had had a calf, he loaded his stock back on the raft and took them back to his farm. The raft was loaded to capacity. How many cows and calves does Brown have? Wt. of cattle was 1000 lbs each. Wt. of calves was 100 lbs each. Brown weighed 200 lbs. Capacity of raft, 10,000 lbs.

take another look at your

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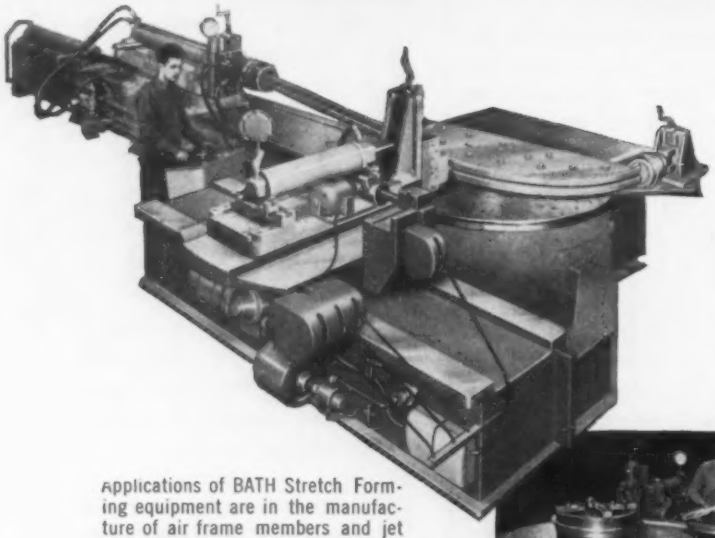
NEXT . . . THE THERMAL BARRIER



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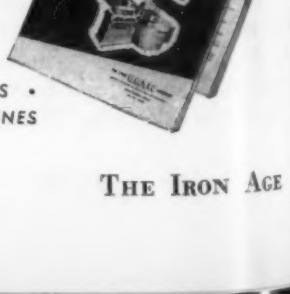

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MANUFACTURERS OF RADIAL DRAW FORMERS • DIES • TOOLS • PRESS BRAKES • TANGENT BENDING SEQUENCE PRESSES • PRESS TYPE BRAKES • SPECIAL MACHINES

The Iron Age Newsfront

Jet Frames Outracing Engines?

Developments in air frame design to meet the requirements of faster jet aircraft are reported running ahead of engine design. While jet engine designers are constantly seeking solutions to high temperature problems to permit faster jet flight, air frame producers are said to be ready to supply frames to meet these needs.

Annual Wage: Which Way?

In view of the recent concessions to labor by Willys and Studebaker and the probability that both American Motors and Packard may request financial assistance, it is interesting to speculate on what is going to happen to the union's buildup to a guaranteed annual wage. Most automakers say they will reject GAW if and when presented.

Set Aside Seen As Down Payment

United Steel Workers regard three cents an hour set aside for wage equality program in aluminum industry as only a down payment. Ultimate cost to industry may exceed 10 cents an hour according to union sources. Additional concessions for this purpose will be sought in subsequent negotiations.

Bill to Kill Auto Bootlegging

Legislation designed to kill automobile "bootlegging" will come up in Washington again next year regardless of whether below-list price sales are still in effect or not. Backers of the "no discount" bill fear bootleg sales will crop up again —sooner or later—and are pressing hard for a legislative remedy while dealer indignation is high.

Production of Shell Molded Cores

Full realization of shell molding's potential is linked with ability to successfully produce shell molded cores. Now one company believes it has the answer with a machine which makes a completely cured core every 30 to 50 seconds with a single cavity box. Adaptable for use with either gravity investment or blowing, the machine has built-in heater plates to complete core curing on the machine.

Cold Rolled Sheet: 7 Year Surge

One of the great changes in the American scene has resulted from development of the continuous sheet mill in 1924 and growing use of its product in autos. But few people realize that growth has been most sensational since World War II. Cold-rolled shipments rose 177 pct from 1946 to 1953; from 4.1 million tons to 11.3 million tons. Auto industry took 50 pct of shipments in 1953, compared to 44 pct in 1946.

Pour Large Centrifugal Castings

Centrifugal castings in stainless and low alloy steels up to 40,000 lb are expected to be cast within a year by a large Midwest foundry. The foundry, now pouring ferrous castings to 20,000 lb and nonferrous castings to 60,000 lb, uses a new high-frequency melting setup.

Welding Wire Improved

An improved welding wire for heli-arc and sigma welding has been developed by a West Coast company. A special chemical treatment has been used to remove oxides, which are a chief cause of poor arc and poor fusion.

How To Reduce Wear Spot Problems

Titanium carbide rod mill guides are lasting longer than expected in some installations. While life is generally higher, in some cases reports claim life is running as high as 500 to 1000 hours.

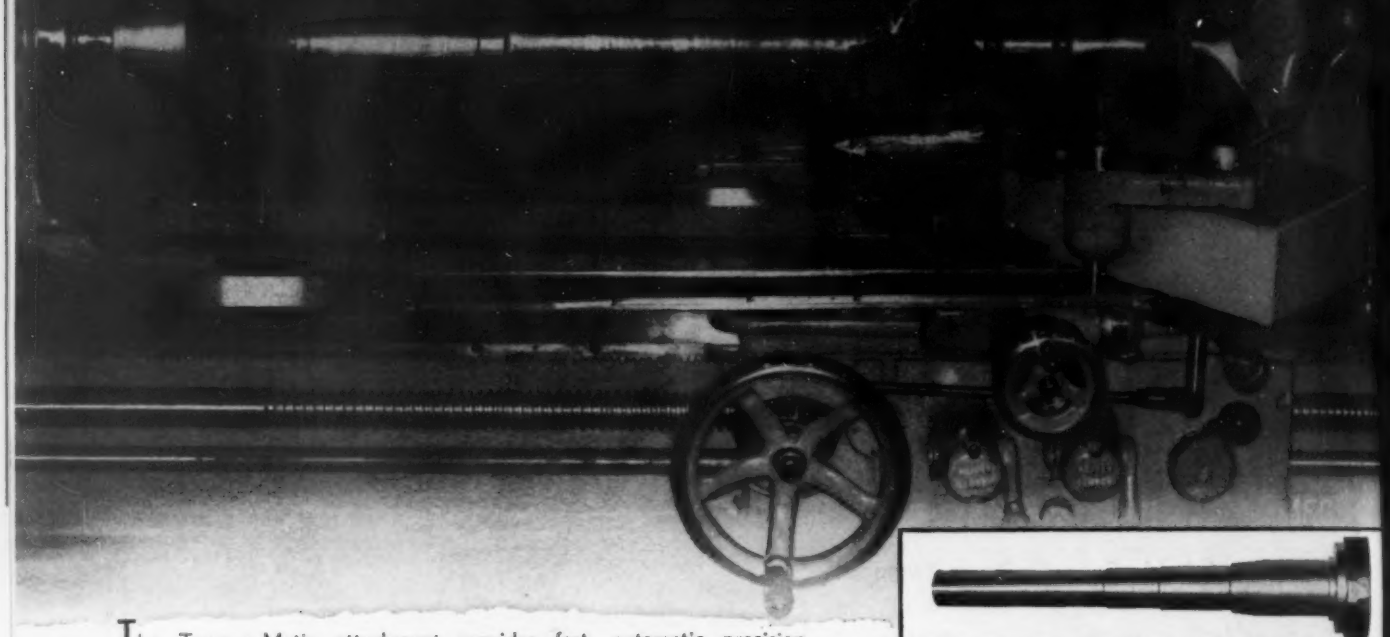
Vibrate Wire Drawing Compound

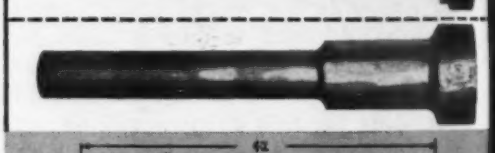
Electromagnetic vibration of the soap hopper in wire drawing setups has proved especially helpful where mechanically descaled rod is drawn, the British report. Vibrating portion of one side wall and hopper bottom is separated from the rest of hopper by rubber strips. Soap adhesion is reported improved.

forged spindles are now turned

200% faster

with the new Axelson Trace-o-Mat Hydraulic Tracer Attachment





The Trace-o-Matic attachment provides fast, automatic precision duplication from flat templates and is adaptable to all classes of work including contour turning, boring and facing. It takes full advantage of the ability of Axelson lathes to take heavy uninterrupted roughing cuts or fine finishing cuts to very close tolerances without the need of a highly skilled operator.

Many outstanding features are designed into the Trace-o-Matic which make it exceptionally economical to own and to operate. Only simple, inexpensive flat soft steel templates which serve for both roughing and finishing are required. Templates can be readily made in your own shop by turning in a bar holder or any other method. In addition, only simple single point tools are required and expensive form tools are completely eliminated. Set-ups require only minutes and after the machine is set to turn the first work diameter it is automatically set to produce all diameters and contours from the template. Small lots or large quantity production work can be handled with equal efficiency and economy.

Your turning costs can be greatly reduced and your production increased by installing a Trace-o-Matic on your present Axelson lathe or by ordering it on a new Axelson lathe. It will pay you to look into the matter without delay!

Write for Axelson's 16-page bulletin describing the New Axelson Trace-o-Matic attachment in detail, or call your nearby Axelson distributor. 6150 Boyle Street, Los Angeles 58, California

PERFORMANCE DATA

Part	MACHINE SPINDLE
Machine	Axelson 20" lathe with Trace-o-Matic attachment
Number of Pieces	6
Material	4820 Steel Forging
Hardness	180 Brinnell
Max. Depth of Cut	¾"
Greatest Precision	+.003"—.000"
Tool Material	Tungsten Carbide
Floor to Floor Time	64 Min. with Trace-o-Matic
Floor to Floor Time	129 Min. Former Method
Production Increase	200% faster

AXELSON MANUFACTURING COMPANY DIVISION
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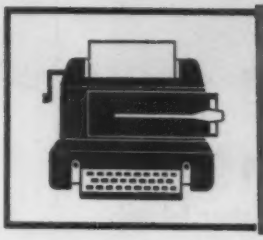


NEWS SECTION

Special Report

PHOTOGRAPHY: New Research Tool

High-speed cameras are rapidly becoming engineers' right hands . . . 3000 frames-per-second film freezes molten metals, shows welding arcs, how metal fractures . . . Steel firms broaden usage—By *K. W. Bennett.*

♦ IF YOU can't figure it, photograph it. With this war cry the industrial photographer has been moving into a field that's been largely the stamping ground of the engineer. As a team, the engineer-photographer combination appears unbeatable.

Operating high-speed motion picture cameras at up to 3500 frames per second, industrial photographers are prying into the operation of combustion units, welding machines, high-speed stamping and forming machines, blast furnaces, electrical relays, steel rolling mills, forming presses.

Industrial photographer Robert Buchanan, U. S. Steel Corp., speaking at the National Convention of the Photographers Assn. of America, suggested a few of the ground rules for use of the camera in solving engineering problems.

Shows Welding Arc

Operating his high-speed motion picture camera at a 3-ft distance in the inspection of welding rod, at 3500 frames per second, this cameraman is able to record the amount of spatter, the amount and quality of metal transfer, and even the play of the arc across the rod tip.

With the high speed camera selling at about $1700, without any special lighting rigs, such single use applications would not look good to the prospective purchaser. But the camera offers a wide performance range, Mr. Buchanan's experience suggests—as was born out by the experience of other convention attendees.

A return on the investment was immediate and concrete in the spotting of a defective mandrel on a tube-piercing mill. This was a direct application of the camera to a production process. Experimental use of the camera on flat-rolling mills suggest that high-speed movie cameras will be used there as well. U. S. Steel Corp., for example, which now owns one camera, will reportedly purchase two more.

Aids Quality Control

In other production applications, the high-speed camera has been used to check nail-forming machines, and rivet-forming machines that operate at speeds that make visual inspection impossible.

In quality control work the camera has been used for welding rod, as indicated above, has been used for impact tests, tensile testing, machineability tests, package-closing machinery, and is now set up to make a simultaneous check on both mechanical and electrical performance of electrical relays.

In the laboratory, Mr. Buchanan pointed out, the use of the camera in a going study of blast furnace combustion has now been given top priority by U. S. Steel. The camera is far from the only tool used in these studies, being used in conjunction with scale-models in the blast furnace studies—it is however the camera that has set the pace. The ultimate payoff—reduced coke consumption.

Freezes Pouring Steel

Another steel mill application, use of the camera to determine how much trapped air is carried down with the column of molten metal when an openhearth is tapped. If you are one of the holdouts who believe that a solid column of hot metal can't carry air with it into the M ladle where it may either burn out alloying elements or be trapped in the cooling metal, there are now action moving pictures that trace the air pockets in the liquid metal column that carry air into the ladle.

In the openhearth the camera has been used in studies of boils.

Slows Fastest Motion

The high-speed motion picture camera magnifies time, and where a conventional camera will be stepping briskly if it attains 128 frames per second, the high-speed camera is specifically designed for a frame range of 500 to 3000 frames per second. Though recom-

Quicker Than the Eye

High speed industrial photography is still in its infancy but new applications are being discovered all the time. A few uses in which the camera has proved an invaluable aid to industry are:

- **For checking machines that operate at such high speeds visual inspection is impossible.**
- **To study combustion in blast furnaces.**
- **For determining how much air is carried in molten metal coming out of tapped openhearth.**
- **For impact tests, tensile testing, machinability examinations, checking operating performance of electrical relays.**

MINING

Iron Ore:

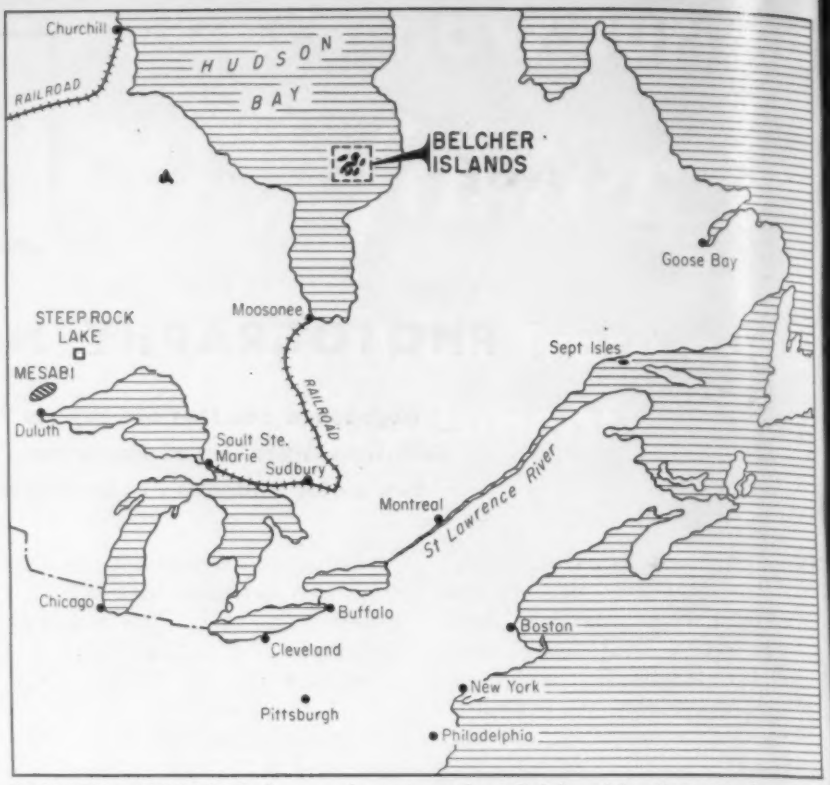
Diamond drill Belcher Islands to prove big ore estimates.

Canada is shaping up as a major source of iron ore for the steel mills of the North American continent.

Already she had made big strides in this direction with the operation by Steep Rock Iron Mines in the Steep Rock Lake area of Ontario, which has been producing around 3 million tons annually and has set a yearly goal of 10 million tons; the Algoma Ore Properties Ltd., at Helen Mine, Ontario, controlled by Algoma Steel Corp. Ltd., has been producing around 1.2 million tons of sinter iron annually. More recently, the biggest of the iron ore developments in the Dominion commenced shipping the end of last July, the Iron Ore Co. of Canada Ltd., operating in the Labrador area. The latter company plans to ship 1.5 million tons of iron ore to steel mills in the United States this year, with an ultimate shipping rate of 20,000,000 tons a year.

Drill Belcher Islands

Now Canada may have in the making another major iron ore deposit that could eventually become a source of millions of tons of ore. First discovered some 40 years ago, the big iron ore deposits of the Belcher Islands in James Bay now are in the preliminary stages of a thorough exploratory test.



DIAMOND DRILLING for ore has started at Belcher Islands in Hudson Bay.

Belcher Mining Corporation Ltd., holding approximately 246 sq miles on the northern sections of the Belcher Islands, is proceeding with a diamond drilling program to outline its presently known deposits and to make a thorough test of its properties.

Over past years only minor attention has been given to the iron ore of the Belchers partly due to transportation problems and other handicaps. However, these difficulties now have been largely overcome. In addition to direct boat shipments to markets of the world through Hudson Bay and Straits during open season, there are now two railways available for transportation of ore. One is from the port of Churchill on Hudson Bay. The other is the Ontario Northland line to Moosonee at the south end of James Bay, which is some 24 hours travelling time from Toronto. The Belcher iron ore deposits are located on tidewater and ore can be loaded directly on ocean-going carriers.

Drilling Will Show

The iron ore deposits have been examined by a number of qualified geologists and mining engineers who report a very large iron ore formation.

In earlier exploratory work many roads were found in the formation where there had been sufficient concentration of ore to present faces up to 25 feet in thickness of an average content of better than 52% natural iron.

However, some geologists believe silica content of the ore will run rather high and the ore may require treatment before use. This is one of the questions to be answered by the drilling program.

SPECIAL REPORT

mended for 3000 frames per second, the camera will do 3200 without undue strain. In practice it's done by boosting input to 160 volts. In one case camera speed was boosted to 3500 frames per second, but this is not a recommended practice nor does it guarantee a ripe old age for the camera.

If it's remembered that a conventional sound film darts past a viewer's eye at 24 frames per second, the super-slow motion of the high speed camera is apparent.

Thus far, the high-speed industrial camera is produced by only two major sources, is not a widely used tool. But with this still and standard motion picture cameras the high-speed motion picture camera supplies another formidable weapon in the on-the-spot plant photographer's arsenal. The photographer has sufficient basic technique to operate it. With an engineer to give him the questions, he's finding an increasing number of answers.

WAGES: USW Studies Aluminum Wages

Aim of wage study program is to create industry-wide job classifications, corresponding wage rates similar to steel industry . . . The 3¢ set aside granted for study may not be enough—*By J. B. Delaney.*

♦ THE UNITED Steelworkers union considers the 3¢ an hour set-aside by the aluminum industry under its new contract for a wage study program as only the "down payment" on the ultimate cost of the study.

Aim of the program is to bring about industry-wide job classifications and corresponding wage rates similar to the classifications already existing in the steel industry. The steel schedule fits the workers into 32 job classes based on skill, responsibility, and other factors.

East-West Differential

The USW recently completed a program with Kaiser Aluminum under which rates closely corresponding to those in steel were agreed upon. In job class 16, for instance, the rate in Kaiser's western plants is $2.381 per hour. Compared with $2.395 in steel. The same job in Kaiser's eastern works carries a rate of $2.37 per hour. Difference between the East and the West comes about through a combination of varying starting rates and increments between job classes.

USW officials say the ultimate cost to Kaiser for the wage rate program was 10.6¢ an hour. This compares closely to the cost to the steel industry, which instituted a joint study with the USW under a War Labor Board directive during the war. The WLB originally directed that 5¢ be set aside for this purpose, but the figure grew as the program progressed to completion.

Steel Was Basis

Under the aluminum contract, the 3¢ setaside will be incorporated into the wage structure between now and next Aug. 1. If the steel and Kaiser experiences are any criterion, the USW probably will be knocking at the door next year for additional money.

One of the reasons why Kaiser agreed to the program for eliminating job inequalities is that the company had already put it into effect in its steelmaking plants. The steel industry manual was used as a basis for the study.

The element of competition between the aluminum and steel industries may be an unspoken influence in the USW's determination to make the wage rates and fringes comparable. It's virtually impossible to say whether either industry has an advantage over the other in this respect, or whether companies within the industry differ from one another in the matter of labor costs.

Benefits Compare

In 1953, U. S. Steel's wage costs accounted for 40¢ of the sales dollar, while in Aluminum Co. of America the cost was only a fraction less—38.2¢. This slight difference could have been due to factors other than actual wage rates. Also, according to the USW, incentive programs in aluminum are not so common as in steel.

Pension and insurance programs in aluminum are comparable with those in steel. In fact, the ALCOA insurance set-up is partially non-contributory in that the company pays the entire cost for the worker himself. If the employee wants to include his dependents in the program he pays the cost for their coverage only. In steel, the companies and the employees share the cost whether only the worker is covered or whether his family is included.

"Take it easy. Thebes wasn't built in a day either."

Another difference between the aluminum and steel contracts is that the aluminum worker is paid time and one-half for Sunday work as such.

James G. Thimmes, USW vice-president, considers the 3¢ setaside for the wage study program in aluminum as a "tremendous victory." He said the union has been after such a study for the last 10 years.

Renew Union Contract

Agreement was recently reached by American Can Co. and United Steelworkers of America on terms of their 2-year labor contract. Signing the agreement of new terms occurred a month before the Sept. 30 re-opening of the contract.

Settlement calls for a general wage increase of 5¢ per hour for 20,000 employes represented by the union in 36 plants of the company, and substantial improvements in group insurance, pension plans.

Contract reopening called for renegotiation of the non-contributory insurance and pension agreements made in Mar., 1950, expiring Mar. 15, 1955. Under the new terms the pension plan is patterned after the plan recently negotiated by the Steelworker Union with the major steel-producing companies. It calls for a minimum retirement pension at age 65 of $140 per month for employes with 30 years of service, and disability pensions from a minimum of $75 per month for employes with 15 years service.

TACONITE: Payoff Begins

Reserve Mining ready to cash in on estimated $180 million investment in benefication facilities . . . Capacity of 10 million tons planned by 1970—*By T. M. Rohan.*

CRUDE taconite is processed into pellets at Reserve's Babbitt, Minn., plant.

◆ THE MULTI-MILLION dollar bet on taconite starts paying off next year in earnest for the nation's steel industry.

Reserve Mining Co., jointly owned by Republic Steel and Armco last week showed off its completed Babbitt, Minn., mine and processing plant and its nearby Silver Bay, Minn., plant, now partially constructed. In the heart of resort country at the eastern end of the Mesabi, the plants are symbolic of the new look on the range.

Reserve's Babbitt plant is a complete production unit although only a one-twelfth size prototype of the bulging Silver Bay processing plant chopped out of taconite rock at the edge of Lake Superior 48 miles away.

Invest $1 Billion

Reserve's investment in taconite has been prodigious. It was originally scheduled for $160 million of which $148 million was financed from insurance companies. It now will probably hit $180 million due to engineering changes and refinements based on experience at the earlier Babbitt operation, which by midyear had shipped 340,000 tons of pellets.

Initial capacity production of 3.66 million annual tons is scheduled to be reached by next August. Projected annual capacity by 1970 if conditions warrant will be 10 million annual tons involving ultimate investment of $350 million.

MINING operation begins when jet piercing machine sinks blast hole 40 ft into the taconite.

With the two other plants in the area under way by Erie Mining Co. (Bethlehem Steel and Youngstown Sheet & Tube major owners) and Oliver Iron Mining Div. of U. S. Steel, all scheduled to ultimately hit 10 million tons annual capacity each, total investment would top $1 billion.

See "Taconite; Mesabi's Answer to the Iron Ore Shortage." Mar. 12, 1953.

Erie is scheduled to hit full production in 1957 with a 5-million-ton plant at Aurora, Minn. and Oliver has a 500,000-ton pilot plant near Virginia, Minn. Total projected output by 1970 would thus hit 30 million annual tons compared to 80 million tons of direct shipping Lake Superior ore transported last year, representing 82 pct of total U. S. supply.

How Mesabi taconite will compare with foreign sources on cost is still somewhat speculative, according to Dr. E. W. Davis, University of Minnesota professor, "Mr. Taconite," who has developed a good portion of the processing machinery and ridden herd on the project for 40 years.

Pellets Run 62.5 Pct

Some fundamental costs however are about 80-90 kwhr power consumption per ton of pellets, a 3500-man work force the year round on a completed 10-million-ton plant. Added, of course, are usual financing costs, general overhead, shipping, etc. Shipped pellets currently run 62.5 pct iron compared to 51.5 pct on current direct shipping ores.

Stockpile Mesabi Ore

Imponderables on which the steel companies are betting are direct control of raw materials sources and absence of foreign influence, a prime defense consideration. Major drawbacks compared to open shipping according to Dr. Haits Gray are that you can't double production of taconite by ordering more shovels and ships, like direct ore.

More development engineers are also sorely needed and steel companies are being pressured for additional scholarships. Least worrisome aspect is reserves "sufficient

for all U. S. requirements for 100 years" according to Dr. Davis.

For defense emergency, Dr. Davis said last week, some quarters are suggesting (1) government could impound remainder of good Mesabi ore or (2) government could stockpile the ore itself. He said privately owned steel firms would be taxed out of sight by unique local laws if they tried either of these plans. He added that at least 3 years is necessary to start up additional taconite processing facilities—too long in the event of emergency.

Operate Year Round

Reserve's Silver Bay and Babbitt operations have involved prodigious construction feats. Up to $7 million worth of construction equipment has been used at one time. Two complete towns are being built from scratch to hold almost 10,000 residents by 1970. These will eventually be incorporated since Reserve has no intention of running company towns.

Will Complete Dredging

A 170,000-cu-yd harbor dredging job will be completed this year. About 1.7 million cu yds of granite were excavated for the Silver Bay plant site at water's edge. Most of it went into two breakwaters already twice levelled by mountainous seas. Four 100-ft high, 26-ft diam silos and 24 storage bins were built for year-round operation while ships are tied up for the winter.

A 48-mile railroad inland to Babbitt using 140-lb rail to take the pounding of 110-car trains weighing 251,000 lb is completed. Over 5600 carloads of construction material will eventually be required for the railroad facilities alone.

Install Giant Crusher

At Babbitt the world's largest crusher will be installed, an Allis-Chalmers gyratory weighing 625 tons. This will chew up 3500 tons per hour, handling pieces up to 5 ft and, in series with four smaller crushers, reduce them to 3 in. max diam. The five crushers are sunk in a 168-ft pit blasted out of rock.

At Silver Bay the ore will be reduced to minus 265 mesh for separation and pelletizing.

Long-Awaited Project

The Mesabi has waited a long time for taconite to come through. The Babbitt plant is built on the site of one started in the early 1920's which was knocked out in 3 years by high cost mining and the 1921 panic which collapsed ore prices.

HEAVY DUTY railroad connects plants at Babbitt and Silver Bay.

RAW MATERIALS

The decline of the Mesabi has been heralded since the end of World War II. But last week it was looking stronger than ever.

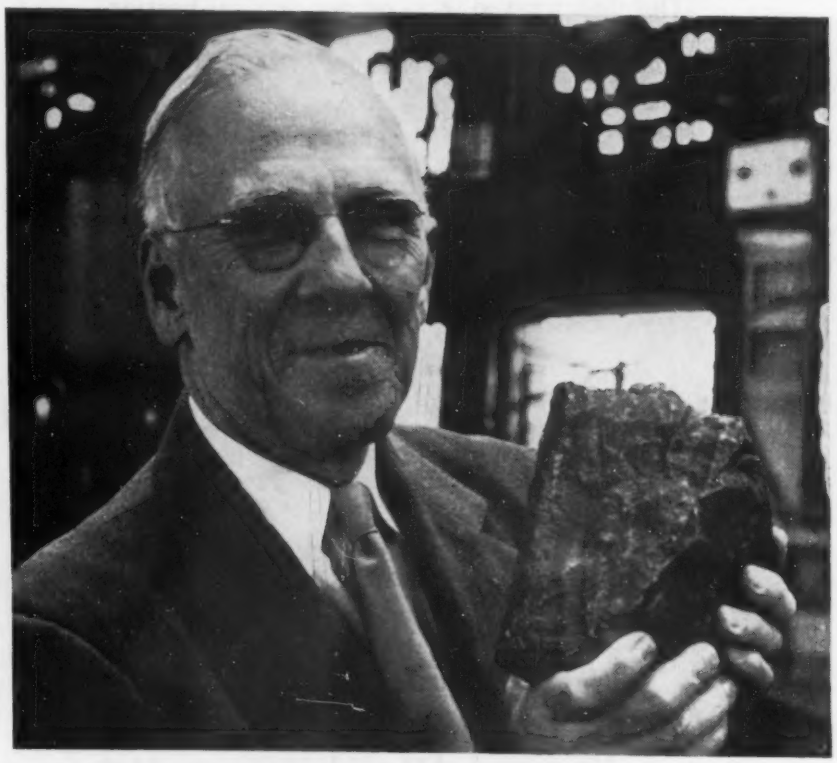
Have Enough Copper

Copper supplies to meet expanding domestic demand will be adequate in the future because of anticipated increases in domestic production, imports, and scrap availability.

Forecasting this situation is the new *Copper Industry Quarterly Report* published by Business and Defense Services Administration.

The current report discloses that non-defense deliveries of brass and wire mill products in the second quarter this year were larger than those in the preceding quarter.

Copies of the new publication may be obtained from Superintendent of Documents, Government Printing Office, Washington 25, D. C., at an annual rate of 50¢. U. S. Commerce Dept. also will have single copies available at a cost of 15¢ each.



"MR. TACONITE," E. W. Davis, professor at University of Minnesota, has been responsible for development of much taconite processing machinery.

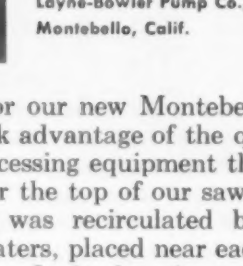
WHEREVER YOU ARE JANITROL WORKS BEST

"Janitrol Engineering made 10 units do the job of 15 for us!"

A STATEMENT OF Mr. H. M. Watkins, Manager, Layne-Bowler Pump Co., 2943 S. Vail, Montebello, Calif.

"For our new Montebello plant, Janitrol engineers took advantage of the quantities of stray heat from processing equipment that would have accumulated near the top of our saw-tooth roof. This pre-heated air was recirculated by Janitrol Gas-Fired Unit Heaters, placed near each roof peak, high above the floor. Janitrol engineers of Natural Gas Equipment, Inc., Pasadena, found that in this particular installation only 10 units were required, as compared with 15 when placed at the normal 8-foot height.

"This design saved us ⅓ on our original heating installation cost. And with fewer units, we've realized substantial fuel savings ever since."



Heat from these Janitrol Unit Heaters is directed to the floor with high velocity nozzles.

The experience of Janitrol engineer-representatives can help you select proper equipment to get more value from your heating investment. Whether you are building or remodeling, send us your problem. No obligation.

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Tools:

Volume only 10 pct below 1953's record high.

Dollar volume of the contract tool and die industry is expected to produce more than $700 million worth of special tooling in 1954 according to report of National Tool & Die Assn. This year's volume will be only 10-12 pct off the all-time record dollar volume set last year.

NTDMA's survey of tool and die sales for first half of 1954 shows a steady increase since February. June shipments this year rose 7 pct above May and equalled June 1953.

Defense Work Drops

Increased tooling activity provides a clue to what mass production industries are planning this fall. Automobile, aircraft, household appliance and electronics manufacturers have invested in new tools, dies, jigs and fixtures in sufficient quantity to indicate expectation that next few months will bring increased orders, stepped-up production.

Defense work is currently at a low ebb in the contract tool and die industry, according to George S. Eaton, NTDMA's executive secretary who reports defense work is now accounting for from 10 to 50 pct of total business. This is in contrast to 18 months ago when many shops depended on defense work for most of their volume. Since the over-all tool and die business is expected to be off only about 10 pct for the year despite defense cuts, there is further indication of a substantial upturn in civilian production this fall.

Backlogs Dropping

Most business coming into the contract tool shops is in the "urgent" classification, Mr. Eaton reported. He added that this is causing many shops to work close to 50 hours a week. Backlogs are continuing their long descent, having decreased another 6 pct in June. Practically all shops can begin work on new orders very shortly after they have received an order.

STAMPING: Idea Paces Fast Growth

Sahlin developed iron hand in 1940 . . . Started company 7 years ago . . . Will gross more than $1 million this year . . . Solid background a big help . . . Automation starts chain reactions—By *R. D. Raddant.*

♦ IRON HANDS of the Sahlin Engineering Co. are synonymous with stamping automation. Their mechanical fingers are handling stampings in almost every plant of significant size where speed and efficiency of stamping operations pay off in blue chips.

Detroit has now become the automation capital as well as the automotive capital of the world. Here the 7-year-old company founded by Henry Sahlin stands out as an example of opportunity in automation for those who can make contributions to this expanding concept of mechanical handling.

Solid Background Helps

When he founded the company in 1947, Mr. Sahlin had a long record as research engineer and developer of stamping methods in Briggs Mfg. Co., Budd Co., Fisher Body, and the E. W. Bliss Co. At Budd, Fisher Body and Bliss he worked with Del S. Harder, now vice president in charge of manufacturing at Ford, who coined the word "automation" and put it into practice in Ford operations.

Mr. Sahlin actually developed his first Iron Hand in 1940. It was a giant claw designed to lift large panels that required several men to drag off the press, a job that was slow, hard, and sometimes dangerous.

Tops Million Dollars

In 1947 he set up his own engineering office and, with only a sketch on paper, approached three large manufacturers. All three visualized the benefits that it would return and all three placed orders. Since then the company has had more business than it can handle.

This year more than $1 million is already on the books in orders. Sahlin Iron Hands are found in almost every large stamping company both in the U. S. and Europe. At the request of customers, the company has been forced to branch out to develop transfer machines, extractors, special feeding and unloading machines, and types of gripping jaws.

Takes Cautious Approach

Mr. Sahlin is the first to agree that apportunities in automation are "unlimited" and he characterizes today's accomplishments as "only a needle in a haystack" compared to what can be done.

But some of his own rules should be a warning to some who might want to go too far too fast. For example, he doesn't believe he could have accomplished what he has without the wide background and knowledge he gained in industry. For years his work was chiefly concerned with increasing efficiency and automatic handling in the auto industry's biggest stamping plants and he thoroughly knew his field.

HENRY SAHLIN, inventor and developer of the Iron Hand, and his son Richard, president of Sahlin Engineering Co., inspect one of the swinging arm Iron Hands that will be used for automatic handling of large stampings for a 1955 auto body.

He insists he must know the entire job in question before he even discusses the sales angle. He has resisted broadening his operations because he feels, in his own words, he "must have the whole panorama" of each particular operation. He also has turned down business because he wasn't sure the buyers were sold on the basic idea, which he feels is necessary for successful operations.

Starts Chain Reaction

But within these self-imposed limits, Iron Hands have made great contributions to industry and have contributed materially to the revolution in stamping operations that has occurred in the last few years. Due to automation, old plants with closely packed presses have had to be revamped. However, Iron Hands can be applied to presses that are already installed.

The speed at which presses can operate with mechanical handling as opposed to manual handling made it necessary to construct new plants with press lines laid out for mechanical transfer of large panels.

With mechanical extracting, turnover, and loading operations, presses can be utilized to their capacity so the full value can be obtained from dies and presses.

For example, one line being laid out for stamping the hood of a 1955 car will include five Iron Hands, one turnover, transfer and load, and three transfer and load operations, all Sahlin engineered. It will handle more than 500 hoods an hour.

Mr. Sahlin thoroughly concurs in the trend to standardization of automation equipment, believes custom installations unnecessary.

Tanks:

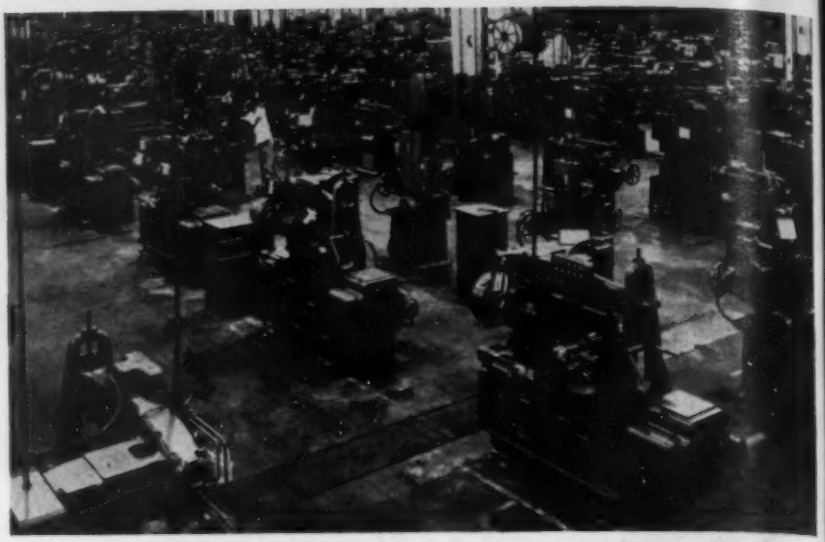
Stand-by procedure keeps engine plant ready.

Michoud Ordnance Plant in New Orleans, the Army's tank engine production center, is the largest "stand-by" defense plant in the U. S. today. Operated by Chrysler Corp.'s Tank Engine Div., the plant produced 810 bhp Continental tank engines from June, 1951 to Mar. 1954.

R. E. Hewlett, general manager of Tank Engine Div., said the plant, maintained on a stand-by basis for the Army with a small permanent work force, can be reactivated almost overnight for mass production of engines for medium and heavy tanks. Peak employment during volume production at Michoud was 2,250 persons.

On stand-by schedule, all of the plant's 2,400 machines are kept in excellent operating condition. Each machine is cleaned and oiled regularly and defective parts are repaired or replaced.

Intricate machines, such as gear grinders have sensitive electrical apparatus that would deteriorate unless used. As a result, machines are run periodically ("cycled") to check performance. After cycling, machines are inspected for rust and checked for sign of excessive wear.



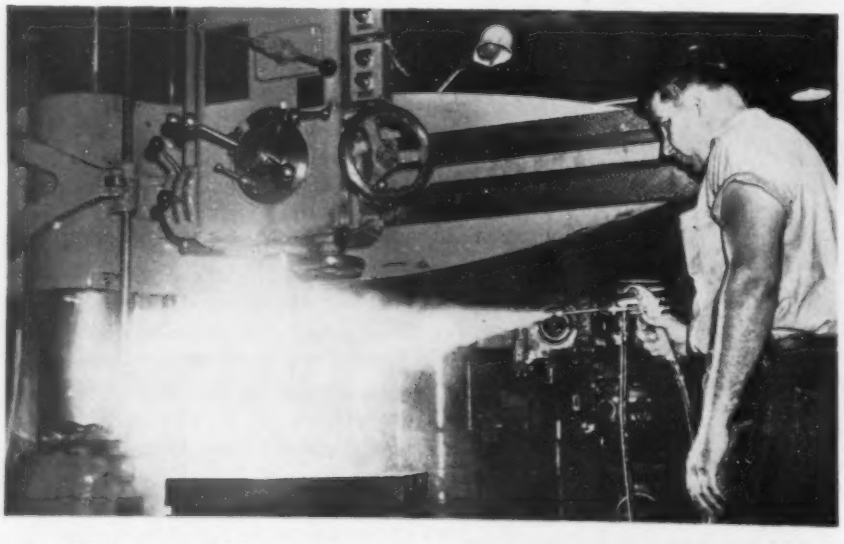
SOME OF THE 2400 machines that are maintained in top operating condition at Army's huge Michoud Ordnance plant in New Orleans.

In contrast, Hewlett said, "mothballing" of plant equipment would have involved coating all machines with heavy grease, dusting them with corrosion inhibitor crystals and encasing them in a cocoon of wire mesh, anti-corrosion paper and a gelatin substance.

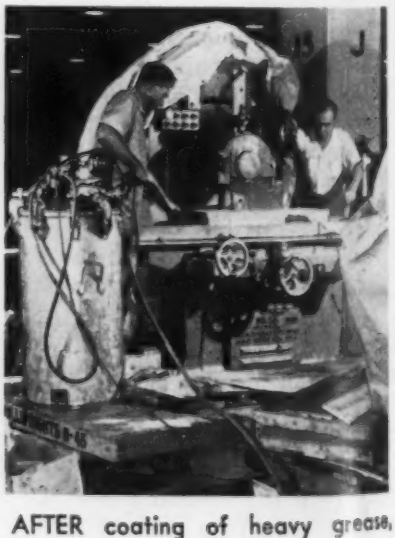
Three to four months would be required to begin putting mothballed equipment into operation. "By comparison," said Mr. Hewlett, "we can begin machining parts within a matter of days and could be in tank engine production in a matter of weeks, provided ample manpower and materials were available."

Stand-by operation started at Michoud March 1, 1954, involved the following standard procedures:

1. Every machine was stripped completely and cleaned with a solvent to cut grease and grime.
2. Machine surfaces were cleaned and coated with a heavy oil containing rust preventive properties. Coolant and hydraulic lines were drained and flushed with an oil which also coated interior surfaces.
3. Machines were reassembled and again coated with a heavy oil.
4. Each machine was cycled to insure that it was operating properly. All worn or defective parts were repaired or replaced.
5. Test cell equipment was also disassembled and all its parts thoroughly cleaned and greased. Mercury and alcohol were removed from the various instruments.



MACHINES at Michoud plant are periodically run to maintain perfect operating condition, then sprayed with heavy, rust-preventive oil.



AFTER coating of heavy grease, anti-corrosion type of spray, machines are stored in paper cocoons.

ATOMIC ENERGY: How's Your IQ?

Common misconceptions of security have held back interest and participation . . . But new atomic energy act directs that more non-classified information be made available to public—*By W. V. Packard.*

♦ A LOT OF PEOPLE who ought to be interested in atomic energy have been scared away by some common misconceptions. It's a shame, too, becouse the field is loaded with promising prospects for individuals and industrial companies. And the policy of the government is to encourage interest and participation of industrial firms, educational institutions, research foundations, and individuals.

Misconceptions of security are perhaps doing most to hold back broad interest and participation by the public. Despite educational efforts of the Atomic Energy Commission and others, many people still have the idea that most of the useful information is locked away in vaults marked "top secret," available only to top brass and security-cleared civilians.

Encourage Participation

Such is not the case. Policy of the government is to increase, not limit, public information on atomic energy—so long as national security is not involved in any way.

The Atomic Energy Act of 1954 reflects that policy. For example, an unpublicized section (Section 145-f) directs AEC to set up liberalized rules for access to data needed for peacetime development of energy. This opens the way for wider participation by private industry in nuclear power development. And it is hoped it will speed gains in the field of reactor technology.

Open to All

Some people also mistakenly believe that access to atomic energy developments is restricted to firms and individuals directly engaged in the programs. The fact is that AEC has released nearly 9000 unclassified reports, many having significant implications in current industrial activities.

Moreover, these 9000 non-secret reports have been screened and condensed into a convenient AEC bibliography series containing highlights of the 800 reports considered of particular interest to industry.

Handy Reference Helps

Called "Selected Reports of Interest to Industry," this bibliography is a good starting point for any individual or firm that wants to get up to date. The entire set is available for $2.25 from Office of Technical Services, Department of Commerce, Washington 25, D. C.

Individual sections may be purchased as follows: Chemistry & Chemical Engineering, 45¢; Construction & Civil Engineering, Mining & Geology, 25¢; Electronics & Electrical Engineering, 35¢; Health & Safety, Industrial Management, 25¢; Mechanics & Mechanical Engineering, 25¢; Metallurgy & Ceramics, 35¢; and Nuclear Technology, 35¢.

The reports are also available at 42 designated Industrial Information Depository Libraries across the country.

Keeping Up to Date

Another good general bibliography of literature covering major aspects of atomic energy is "Unclassified Bibliographies of Interest to the Atomic Energy Program." This book is available for 55¢ from Office of Technical Services, Department of Commerce, Washington 25, D. C.

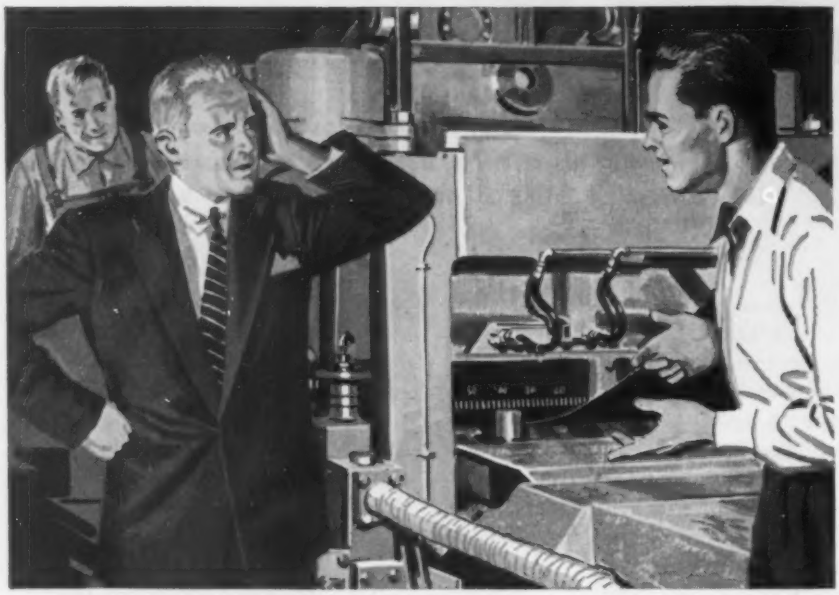
Once you have gotten up to date by reviewing the bibliographies and reports, the best way to keep abreast of current atomic energy developments is to read "Nuclear Science Abstracts," a semimonthly journal published by AEC.

This journal contains abstracts

PART OF WALL was torn down to remove this 40-ton blast furnace hopper from Pittsburgh Steel Foundry Corp. plant. Hopper was built for Koppers to be installed in furnace being built for Great Lakes Steel plant at Zug Island, a short distance from Detroit.

(Advertisement)

If maintenance is your problem BERYLLIUM COPPER MAY SOLVE IT



THE PROBLEM. Massive flash welders like this are the key to mile-a-minute production of steel strip. They join wide coils together so that they may be continuously fed into the pickling operation. Welders used to be equipped with solid dies made of various electrode materials, but the results were far from satisfactory. The dies picked up flash, and required frequent dressing. They wore rapidly or even fractured under the heavy pounding. Result: heavy maintenance costs, excessive downtime, lowered production.

THE SOLUTION. Many mills, seeking a way to minimize such interruptions and their bad effect on over-all operations, have now redesigned their flash welder dies. The solid die has been replaced by an assembly which uses a fitted insert or electrode made of tough wrought Berylco beryllium copper. The Berylco inserts are capable of taking heavy punishment and do not fracture. They wear better. Flash adherence is reduced, and thus dressings are less frequent. Maintenance costs are down, production is up, and with it all welds are smoother and sounder. Only Berylco, with its combination of electrical conductivity and ruggedness, could have made such results possible.

THIS IS A TYPICAL ILLUSTRATION of Berylco's ability to cut maintenance costs to the bone. The same success might be cited in such products as business machines and home appliances, where beryllium copper parts, large and small, assure continuous customer satisfaction and eliminate expensive service calls. Plan now to build service-free performance into your product with Berylco. For sample material or engineering help, write THE BERYLLIUM CORPORATION, Dept. 4-1, Reading 6, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper

and indexes of all the latest nonclassified AEC reports as well as pertinent material from domestic and foreign publications. The journal is available for reference at depository libraries or may be purchased for $6 per year from Superintendent of Documents, Washington 25, D. C.

What Firms Can Do

It's a good idea to select a man of suitable technical education and experience to review unclassified atomic energy information for the company.

Republic Steel Corp. recently hired well-known nuclear physicist Dr. Robert P. Peterson "because of the tremendous role nuclear physics will play in the nation's industrial progress."

Though Republic is probably an extreme example of progressive interest in the field, it certainly shows how broad the industrial implications of atomic development are becoming. Short of hiring a nuclear physicist, many firms can and should take steps to keep themselves better informed on atomic developments of possible significance to industry.

Strike It Rich

When it comes to prospecting for uranium, the public is a lot better informed. AEC's "Prospecting for Uranium" has sold 150,000 copies to companies and individuals who want to strike it rich.

Steps in perfecting airborne uranium prospecting include: Development of highly sensitive scintillation detectors; use of radar altimeters to correct radioactivity measurements for altitude variations, and establishment of systematic surveying techniques.

Some 200,000 miles were flown by airborne prospectors during the first half of 1954. And government and private prospectors each drilled 500,000 ft.

AEC has paid out $3.6 million in bonus awards to 379 properties on the Colorado Plateau. These awards are for first production and are in addition to value of the mining property.

TRADE: Ike to Face Stiff Test

President planning to push his liberal trade policy during the next session of Congress . . . Will face bitter opposition from bloc in Senate . . . Ike sees freer trade as anti-Red weapon—By *N. R. Regeimbal.*

♦ PRESIDENT EISENHOWER's proposed economic attack on world Communism — through liberalized U. S. trade and tariff policies—will face bitter and possibly overpowering opposition in the session of Congress which convenes in January.

The President, preparing to make an all-out appeal for his "trade-not-aid" program to combat the Communists' ever-widening economic sphere of influence, will again ask Capitol Hill for a 3-year extension of the Reciprocal Trade Agreements Act and for power to make selective cuts of 5 pct a year in unnamed imports.

Eased Trade With Reds

In addition, he is expected to press for other recommendations of the Randall Commission for easing the Buy America Act and the escape clauses and for relaxed customs laws.

Lining up in opposition to the Administration will be a bloc of at least 30 senators from states having unemployment problems, with Sen. George W. Malone, R., Nev., at or near their head. At the last session, this group successfully scotched Mr. Eisenhower's proposal, forcing him to settle for a simple one-year extension in the old, used-up trade act.

Test Gatt

The Eisenhower Administration, however, has already carried off one phase of the President's program by drastically relaxing trade embargoes with Soviet Russia and its European satellites. It is significant that the announcement of the relaxed trade rules came within a week after Congress adjourned.

Another phase of the program will get its acid test Sept. 14-17 when State Dept.—emerging as one of the chief architects of the Eisenhower foreign trade policy—holds public hearings in Washington in preparation for the 33-nation Geneva conference in November to revise the international General Agreement on Tariffs and Trade.

GATT was designed to serve as the principal mechanism for a permanent world trade organization, but has so far failed. The U. S. delegation will test this country's trade leadership by attempting to get reductions in foreign import restrictions on dollar goods.

President Eisenhower contends that free trade is a potent weapon with which to stem the tide of Red economic agression. His theory is that if this country provides, through trade channels, the necessities of life for some of the depressed countries, the appeal of Communism will be lost.

What Ike Thinks

In addition, he believes that free trade is a powerful anti-propaganda device, proving to these countries that the U. S. is interested in their welfare.

The alternative to free trade, Mr. Eisenhower says, is that the U. S. will become "an island of freedom in a sea of Communism."

Opponents argue that imports would only increase by $2.6 billion a year if all tariffs or quotas were removed, and that tariffs have an important effect on less than 10 pct of the total import dollar volume. But, they say, these few tariffs do serve to protect the relatively few domestic industries particularly vulnerable to foreign competition.

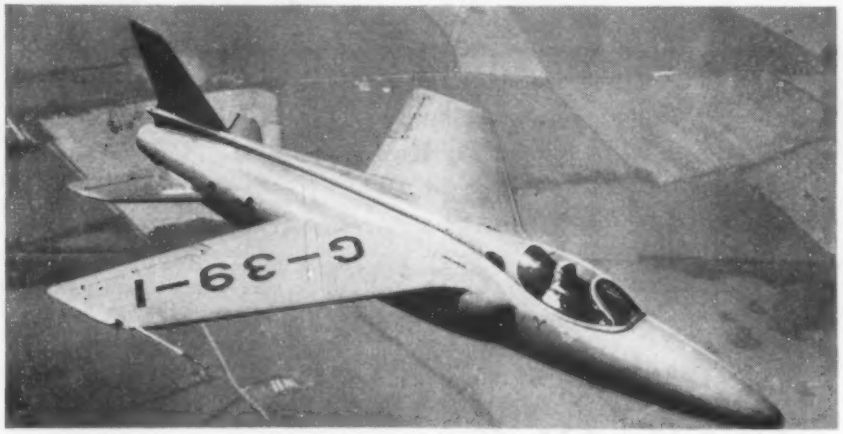
Autos:

Britain's auto industry booming . . . Set export record.

British automobile manufacturing centers are enjoying the biggest boom of all time. Production continues at a high rate and exports have touched new peaks.

The number of passenger cars exported in July hit a new high. Total exports were 38,999, worth $35 million, compared with a previous peak of 37,926 in January, 1952, when the value, however, was higher, at $37 million.

Truck exports in July were



BEING TESTED is Britain's Midge jet fighter plane. Using light 1640 lb thrust turbojet engine it can do 600 mph. Bigger engine will be put in later.

LATTICE BRAID* Packing

outlasts ordinary packings

$3\frac{1}{2}$ to 1 on Mine "Pole" Pumps

*Registered Trademark. *Only* Garlock makes LATTICE BRAID rod and shaft packings.

Reciprocating "pole" pumps handling gritty water underground in an iron mine are subjected to unusually severe service. That's why a prominent Lake Superior district mining company decided to try LATTICE BRAID Packing on their pumps in a mine in northern Wisconsin. Previous packings had never lasted over one month. This large mine now reports that LATTICE BRAID lasts 3½ months *and* that it causes *less* wear on the "poles" (plungers) than any other packing used.

Put Garlock LATTICE BRAID Packing to work for your company. All the braided strands of this unique packing are lattice linked together into one structural unit. The strands hold together even when the packing is worn far beyond the limits of wear of ordinary braided packings.

LATTICE BRAID is made from flax, cotton, asbestos, wire-inserted asbestos, Teflon, and asbestos with Teflon impregnation—for various types of services.

Get all the facts about LATTICE BRAID *Packings. Contact your Garlock representative or write for new folder AD-131.*

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK LATTICE BRAID PACKING

higher than for any month since May, 1952, numbering 12,141 units, compared with 10,015 in June and 11,396 in July, 1953. The best figure in more than 2 years was also registered in exports of farm tractors, with 10,400 units sent overseas.

Backlog Mounts

In Birmingham, England, Austins are breaking production records daily, with output now amounting to 4000 vehicles a week. Rootes of Coventry and Vauxhall at Luton tell the same story.

At Dagenham, on Thames-side, Ford is turning out 1250 cars, trucks and tractors a day, and yet order backlogs are still mounting. Potential home buyers of Anglias and Prefects have to wait 6 to 12 months for delivery.

At Cowley, near Oxford, demand for the Morris Minor is so great that even the most desirable export orders wait 18 to 20 weeks, while home buyers don't get delivery for at least 9 to 12 months.

Ease Financing

The bicycle and motorcycle industries also continue to expand their exports. For the first time the U. S. has become the leading overseas market for both industries. Total exports of bicycles, motorcycles, parts, and accessories are now running at a higher rate than in 1953 when they hit $100,800,000. Home sales have been helped by the relaxation of stringent installment buying restrictions.

A bicycle of any make or type can now be bought with a deposit of $2.80, compared with an initial payment of 25 pct of cash value under the previous regulations. The repayment period of 52 weeks has not been altered.

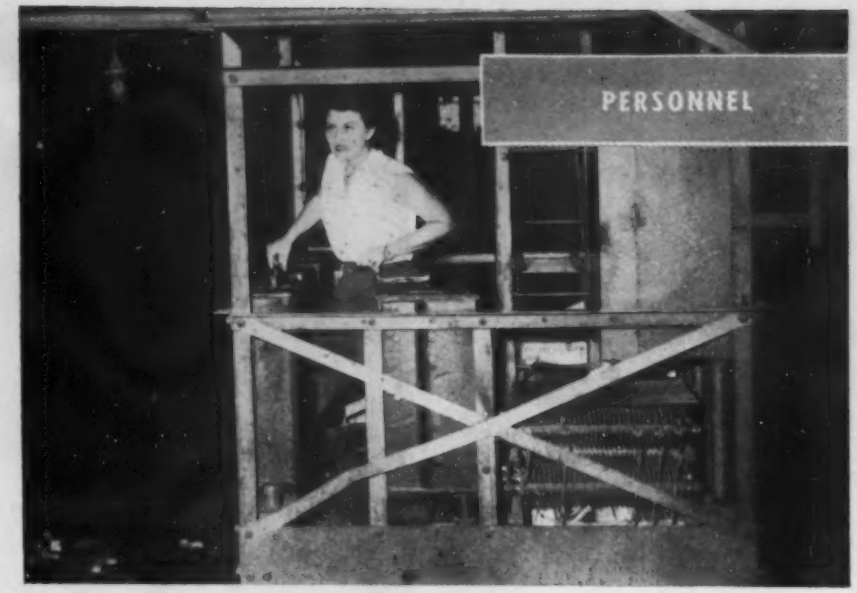
For motorcycles, the one-third deposit has not been changed, but installments can be spread over 24 months instead of 18. Car dealers will accept 25 pct down and the remainder over 24 months, but will become less interested in financing arrangements if delivery periods lengthen further.

Women:

Rosie the Riveter is still on the job for industry.

The woman's touch is lying more and more heavily on industry as women continue to qualify for an increasing number of occupations in the nation's manufacturing plants.

These pictures of a few of the 25,000 women employees at Westinghouse Electric Corp.'s plants and offices highlight the wide range of jobs now held down by the distaff side. Jobs vary from clerical and stenographic through direct production to design, marketing, engineering and research. Of its 77,000 stockholders, Westinghouse points out that more than 38,000 are women.



ELSIE McCULLOUGH is one of five women crane operators at Westinghouse Steam Div. plant in South Philadelphia, Pa.

PHOSPHOR EXPERT Dr. C. K. Lui Wei does research on fluorescent lamps at Lamp Div. lab.

SISTERS Mary and Jane Sakolowski wire complex control panels at Motor & Control Div., Buffalo.

BAKING CAKES at Home Economics Institute aids in development of better kitchen ovens.

HOME LIGHTING Dept. head, Myrtle Fahsbender is a recognized authority on illuminating engineering.

ENGINEER Emma Barth checks generator construction at East Pittsburgh plant.

FROZEN FOODS kept in test freezers are checked by taste panel headed by Julia Kiene.

Pick New FOA Exec

New director of the Office of Industrial Resources, Foreign Operations Administration, is H. F. Johnson, president of S. C. Johnson & Son, Inc., of Racine, Wis.

The new official will supervise FOA programs for developing industrial production in countries taking part in the Mutual Security Program.

He succeeds Glenn H. Craig, who remains with FOA as a special consultant.

During World War II, Mr. Johnson served with the U. S. Rubber Development Corp. in Brazil.

Award Battery Contract

Navy Dept. announced recent award of a $1,250,000 contract for manufacture of submarine batteries to Gould National Batteries, Inc., Chicago.

This makes a total of approximately $4,250,000 in submarine battery contracts awarded to Gould-National in the last 3 months.

Update Ordnance Works

Beginning soon at the Alabama Ordnance Works, near Sylacauga, Ala., will be a $46-million rehabilitation job affecting seven lines producing smokeless powder and other explosives.

Some 4600 construction workers will be employed at the peak. Project is to be performed by contract under supervision of the Corps of Engineers. The Army anticipates that 2 years will be required to complete the job.

Contracts Reported

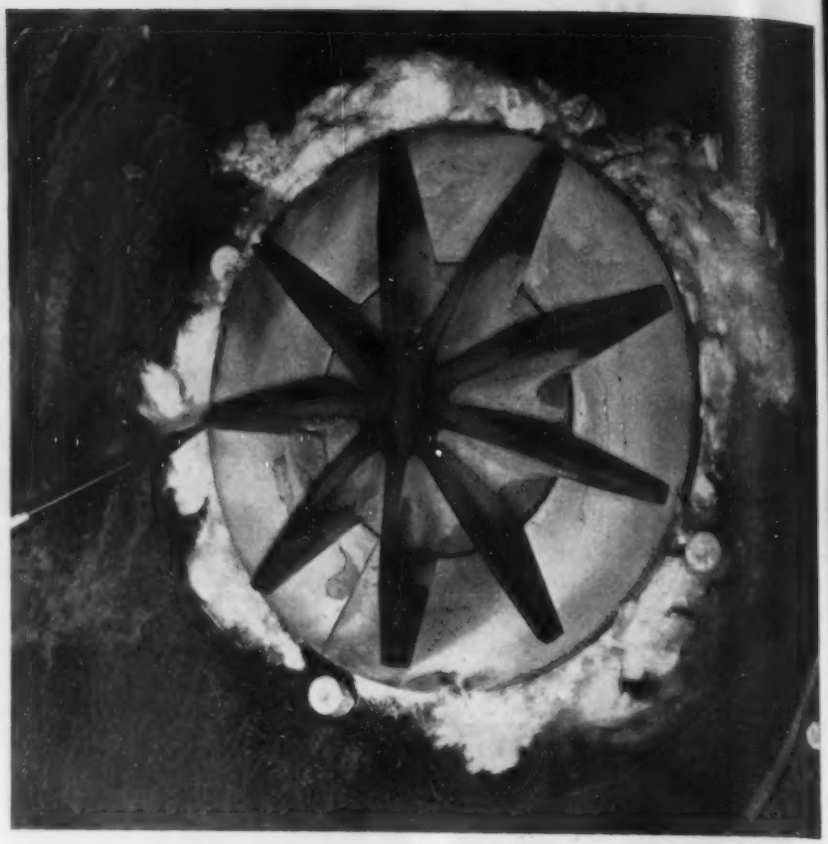
Including description, quantity, dollar values, contractor and address.

Repair parts for diesel engines, 720, $105,335, Cleveland Diesel Engine Div., General Motors Corp., Cleveland, Ohio. *A. O. Chash.*

Trucks, magazine, electric boom lift, 43 lot, $271,222, Yale & Towne Mfg. Co., Chicago, Ill.

Automatic transmission measuring system, 3, $91,275, L. & O. Research and Development Corp., Wayne, Pa.

Trucks, fork, electric, 65, $275,502, The Baker Raulang Co., Cleveland, Ohio.



GAS TURBINE impeller of sintered titanium carbide after 100 hours operation at 1850° to 1900° F and 30,000 rpm.

Test Titanium Carbide Turbine Parts

More powerful and efficient gas turbines for industrial and automotive applications are envisioned by Kennametal, Inc., Latrobe, Pa., on the basis of tests involving use of sintered titanium carbide components in a test tube turbine.

The new material, according to Kennametal, also paves the way for more powerful jet engines by making possible operating temperatures at least 300°F higher than the present operating temperature range. But engines of new design would be necessary before this goal could be realized.

In the test, the titanium carbide parts showed little apparent damage after 100 hours of continuous operation at temperatures of 1850° to 1900°F and speed of 30,000 rpm. Gas turbines ordinarily operate at 1400° to 1600°F.

Kennametal developed the material, Kentanium, several years ago and has improved upon it in subsequent development work. It is being used in a number of industrial applications, including rod mill guides, inserts for hot die forming, and hot extrusion die inserts for light metals and brass.

Company engineers believe that if gas turbine operating temperatures could be increased to 1800° to 1900°F, power output could be increased 50 pct or more, or tripled if the temperature were raised to 2000° to 2300°. Fuel efficiency could be improved 50 to 100 pct or more. Or jet engine power output would be greatly improved if fuel consumption were maintained.

Kennametal visualizes turbines of increased power and efficiency for ships, oil pipelines, and automotive applications through higher operating temperatures.

Report To Management

You would expect that since we've just been through a recession personal income would have fallen along with production, new orders, employment and the length of the work-week. It did in the '49 recession, but it hasn't in '54. That's one very important reason this year's business decline hasn't been so sharp as many anticipated. Consumers had money coming in so they kept on buying.

Personal income this year not only hasn't dipped—it's actually been running ahead of the record '53 pace.

Through the first 7 months of '54 personal income averaged $285.6 billion per year, $200 million more than in same period last year. And if business picks up in the fall—it's almost inevitable that it will—personal income this year will be about $1 billion higher than it was in '53.

Reasons for the seeming paradox of increased personal income during a business slump are these: the recession has largely been restricted to manufacturing industries; wage rates have been maintained at high levels; corporation taxes have been cut which has enabled companies to pay out more in dividends; increased unemployment compensation payments have helped offset wage losses.

Breakdown of sources of personal income for first half '54 shows that as you probably expected wage and salary earnings for employees in commodity producing industries (includes manufacturing, mining, agriculture) dipped badly. Loss from first half '53 amounted to $4.2 billion per year.

Also off slightly from first half last year was income of unincorporated businesses and earnings from rent. Decrease from '53 for these categories amounted to less than $1 billion annually.

More than making up for these income losses were:

(1) Wage and salary earnings for workers in service industries up $1.8 billion annually; wages and salaries of wholesale and retail workers, up $1 billion per year; and wages, salaries for "other labor" (employer contributions to private pension and welfare funds, compensation for injuries, etc.) which rose nearly $1.5 billion annually.

(2) Income from dividends and interest increased at a $2 billion per year rate in first half '54, reflecting reduction in corporate taxes. Another substantial gain of $2 billion per year was made in income from unemployment insurance, social security, relief, etc.

End result of these changes in personal income is that despite the fact that the U. S. has been in a recession since third quarter last year, personal income this year has been running ahead of the '53 pace. And because of the tax cuts made this year the gain in personal disposable income has been even greater.

Construction contract awards in the first 7 months of '54 were 14 pct ahead of same period '53, according to F. W. Dodge Corp. But most recent figures available show that awards for July were only 2 pct above July '53.

Is this the tipoff construction activity is beginning to slow down? Definitely not. You can expect that the '54 lead in contract awards over last year will continue to diminish because awards in last half '53 were the highest for any previous half year period, topping even record-setting first half '54.

Prospects that this year's construction awards will top last year's are extremely good. Average value of contract awards during the first 7 months of this year has been $1.584 million. To match last year's total volume, contract awards would have to average only $1.271 billion per month in the last 5 months of '54.

Greatest increase over last year on a percentage basis has been in awards for residential construction up 21 pct, followed by heavy engineering which rose 12 pct; nonresidential construction, up 9 pct.

INDUSTRIAL BRIEFS

Gets Contract . . . United Engineering and Foundry Co., Pittsburgh, was awarded a contract to modernize a 16-stand rod mill in the Buffalo Plant of Wickwire Spencer Div., Colorado Fuel & Iron Corp.

Will Supply . . . General Electric Co. will supply more than $4 million worth of electrical equipment for the McLouth Steel Corp.'s new cold strip mill expansion at Gibralter, Mich., during 1954 and 1955.

Merger . . . Olin Industries, Inc., and Mathieson Chemical Corp. have merged to form Olin Mathieson Chemical Corp. John M. Olin is chairman of the new company and Thomas S. Nichols is president.

Relining Contract . . . Ford Motor Co., Detroit, awarded a contract to Standard Boiler & Plate Iron Co., Pittsburgh, for relining of blast furnace "B" at the River Rouge Plant.

New Home . . . Electric Steel Foundry's San Francisco branch moved its sales office and warehouse to larger quarters in Emeryville, Calif.

First Phase . . . Harvey Aluminum Div., Harvey Machine Co., Torrance, Calif., completed the first phase of its impact extrusion program. New mill facilities are now ready for commercial production.

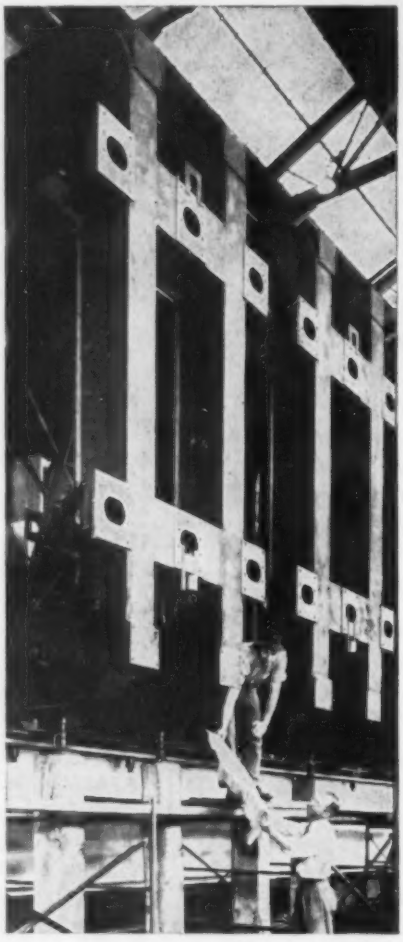
Exclusive Basis . . . Carson, Marshall & Co., Inc., Philadelphia, has been appointed exclusive sales agent for Chester Blast Furnace, Inc., Chester, Pa.

Dividend . . . The Colorado Fuel & Iron Corp. declared the regular quarterly dividend of 62½¢ per share on the Series "A" $50 par value preferred stock.

Distributor . . . Chase Brass and Copper Co. has appointed Baron Steel Co., Toledo, Ohio, and Detroit, a distributor of its line of brass rod.

New Order . . . Lockheed Aircraft Corp., Burbank, Calif., has received a new order for Shooting Star jet trainers. Production will carry over into 1956.

Breaks Ground . . . Enamelstrip Corp. held ground breaking ceremonies for its $300,000 plant addition at Allentown, Pa.



STEEL RIBS for supersonic wind tunnel at Lewis Flight Propulsion Laboratory, Cleveland, being fabricated at Ambridge plant of American Bridge Div., U. S. Steel Corp. Ribs will support flexible stainless steel wall plates which control air flow.

Available . . . Case Institute of Technology, Cleveland, is making its research facilities and talent available to the community by undertaking a research program on industrial waste disposal.

Conference . . . General Electric Co., Schenectady, is staging a special conference Sept. 8-11 for professors of chemistry and chemical engineering from more than 30 leading American colleges and universities.

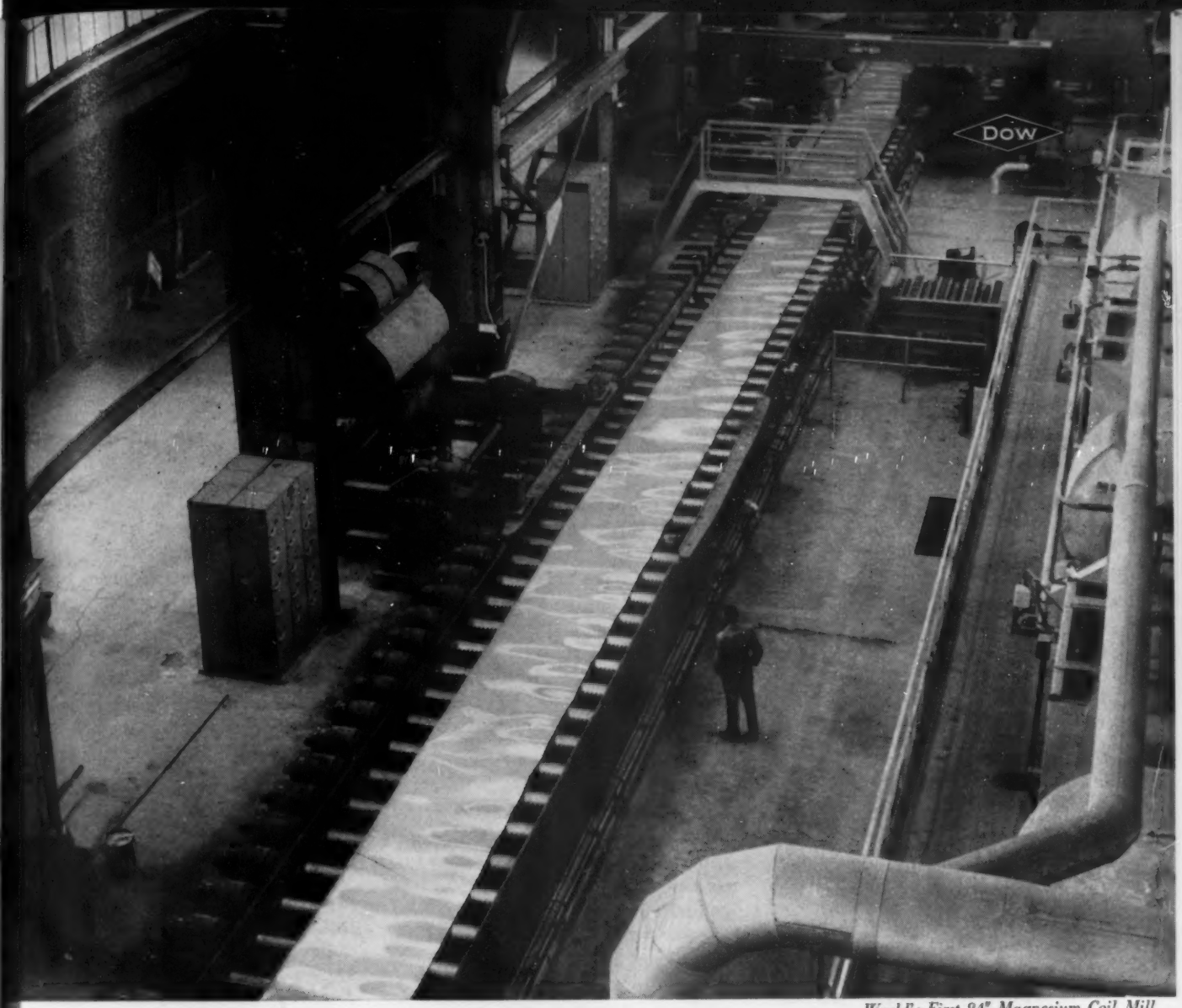
Appointment . . . Kaiser Aluminum & Chemical Sales, Inc., Oakland, Calif., has appointed American Brass & Copper Co. as a distributor of its line of aluminum rod, bar, sheet products and extrusions.

Awarded . . . Acme Aluminum Alloys, Inc., Dayton, Ohio, has been awarded an Air Force contract to construct 46 runway barriers, the aircraft landing safety device which proved so effective in Korea and Japan.

Acquired . . . General American Transportation Corp., Chicago, has executed a contract providing for acquisition of Fuller Co., Catasauqua, Pa., designer and manufacturer of pneumatic conveying systems for dry bulk materials handling.

Expanding . . . Climax Molybdenum Co., Detroit, plans a quarter million dollar expansion which will be mainly to research in molybdenum chemicals and in molybdenum-base alloys for high temperature use.

New Site . . . Victor Equipment Co. has purchased a 6-acre site in Whittier, Calif., for expansion of its Alloy Rod & Metal Div. Another 15,000 square foot building will be erected when the initial construction is finished in October.



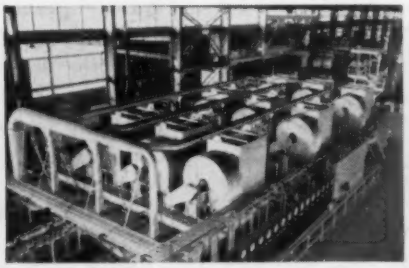
World's First 84" Magnesium Coil Mill.

a new look at Magnesium!

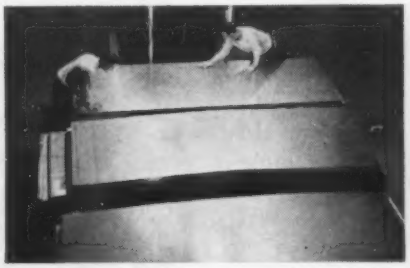
UP TO 25% PRICE REDUCTION ON SHEET AND PLATE

New Dow facilities—now in operation—are producing magnesium sheet in *quantity*. Wider, longer—magnesium sheet now offers a brand new challenge to designers, engineers, manufacturers. To cut costs, to save weight, to add strength—to do revolutionary new things for many products—get the new magnesium story! Call the nearest Dow sales office or write THE DOW CHEMICAL COMPANY, Magnesium Department, Midland, Michigan.

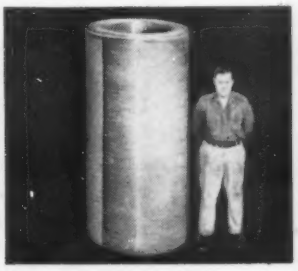
for the first time, large nesium rolling ingots weigh- nearly a ton are being rolled.



Specially designed, carefully controlled ovens pre-heat huge magnesium ingots just before rolling.



Constant inspection plus rigid production controls assure uniform magnesium sheet quality.

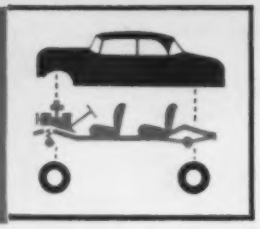


Note how coil of magnesium sheet illustrates new availability in greater widths and lengths.

you can depend on DOW MAGNESIUM

DOW

AUTOMOTIVE ASSEMBLY LINE



GM Command Thrives on Committee Rule

All wheels roll as one . . . No kingpin is indispensible to policy making . . . Interlocking responsibility does much to eliminate the risks of a one-man show, streamline procedure—By *R. D. Raddant.*

◆ THE PROBLEM of filling two top executive posts in General Motors focuses attention for the moment on the organizational system that is responsible for the successful operations of this industrial giant.

This is not a discussion of persons and personalities. But, for the record, the vacancies occur from the retirement of Ronald K. Evans, executive vice-president in charge of operating divisions other than automotive and parts divisions, and Harry J. Klingler, vice-president in charge of passenger car group.

Their respective squares in the organization chart appear high up on the pyramid, but not as high as their exalted titles might indicate. In fact, because of GM's committee rule, names of individuals, including even Harlow H. Curtice, president, appear well below the top committee level.

Committees Aid President . . . This does not mean that the president's power is limited, but it does indicate the importance of committee and staff work in keeping such a large and diversified company as GM operating efficiently at all levels.

Below the 34-man board of directors, headed by Chairman Alfred P. Sloan, are the operations policy committee, of which Mr. Curtice is chairman, and the financial policy committee, headed by Executive Vice-president Albert Bradley. The third committee of major importance is the administration committee, also headed by Mr. Curtice. A large number of the 31 vice-presidents serve as members of these committees. Eleven policy groups also report to the administration committee.

Below the president are the three executive vice-presidents, although the chairman of the financial policy committee stands higher in the chart than do the others. The three are Mr. Bradley, the retiring Mr. Evans, and Louis C. Goad, in charge of automotive and parts divisions.

Left Empty Seat . . . When Mr. Curtice was an executive vice president, there were four of that category. His title then was executive vice-president in charge of the general staff. After his elevation to the presidency, this position was never filled and the 12 executives who made up the general staff still report to him.

In the automotive and parts divisions are three major groups, the automotive group, which Mr. Klingler headed, the body and assembly divisions group, and the accessory group.

Until Mr. Klingler was elevated from general manager of Pontiac to the group vice-presidency, the organization chart showed no such position. This group was directly supervised by the executive vice-president. This has aroused some speculation that the vacancy will not be filled and that the old system will be returned.

"You expect me to do both?"

Heads Best Known . . . Under these groups, which include the engine group, Dayton and household appliance group, and overseas and Canadian group, all in the non-automotive section, are the divisions, each headed by the general manager, who is also a vice-president. These men, particularly those who head the automotive divisions, are probably the best known to the public of all GM executives, chiefly through association with their products.

In spite of this organizational detail, divisional autonomy is the rule. Each division designs, develops, manufactures, merchandises and advertises its own products. It makes its own purchases, in some cases from other parts divisions. Each division develops its own processes and methods, hires and trains its own employees, handles its own public relations and community functions.

The general manager is responsible for building his own organization, coordinating its efforts and planning its progress. But each division has available the financial resources of GM and the staff facilities of the central organization.

Detach Staff Functions . . . Detached from the pyramid structure of the organization chart is the general staff and its sections. These include distribution, engi-

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Sept. 4, 1954...	94,206*	16,500*
Aug. 28, 1954...	95,624	17,872
Sept. 5, 1953...	110,852	21,722
Aug. 29, 1953...	127,411	25,455

*Estimated. Source: *Ward's Reports*

neering, styling, research, Motors Holding Div., real estate, personnel, procurement and schedules, facilities and processes, public relations, and business research.

The executives in charge of these staffs serve in advisory capacity to the operating divisional managements and corporation executives. Functional contacts exist between these staffs and their counterparts in the divisions. These staffs tie in directly with the policy groups where policy recommendations are made by the administration committee to the operations policy committee.

This discussion may be more confusing than enlightening, particularly in stressing divisional autonomy while describing at the same time the importance of committee rule and its checks and balances. The combination of the two may well be the key to GM's success.

Combine:

Integration of Nash-Hudson poses knotty problems.

The first integration of marketing by American Motors was observed last week when Nash's British-made Metropolitan moved into Hudson dealerships for sales and service.

The little car has enjoyed considerable success and it is hoped by American officials that the move will double the potential sales volume.

Meanwhile, American is working hard toward integrating Hudson and Nash production, with all of the body work to be done at Kenosha, Wis., plants.

Benefits Cancel Headaches

Insiders admit that the merger has brought more headaches than anticipated in some quarters, particularly in retiring the Hudson Jet, which brought expensive and costly commitments to American. Hudson also had a fat inventory of steel that has caused a lot of problems in applying it to Nash production in an attempt to utilize it as much as possible.

In spite of the problems, American Motors people insist that benefits of the merger will be apparent when 1955 cars roll off the assembly lines. Introduction of the new lines will be somewhat later than most of the industry because of the complications resulting from the merger.

Mergers Empty Plants

Current decentralization of some auto companies and consolidation and mergers of others has left plenty of vacant automotive real estate in Detroit.

The first large plant to be left empty was the old Lincoln plant which has been standing idle since Lincoln moved all its Detroit operations 20 miles west to Wayne.

As noted above, most of Hudson's body operations have been moved to Nash's home plants, leaving many thousands of vacant sq ft of floor space.

Furthermore, Packard moved its assembly operations to its newly leased body plant and is transferring its engine and other manufacturing operations to a new building north of the city. No plans other than liquidation have been hinted at for the abandoned plant area.

Furthermore, Murray Corp. has been dealt out of the automotive body business and this company has its former body plant standing comparatively idle.

Chrysler Stock Active

Financial circles in Detroit are buzzing over the somewhat mysterious actions of Chrysler stock, which has been making gains recently in a falling market. This is further complicated by the conclusion that the third quarter financial report of the company may show a loss for the first time in years.

The market strength is reported to be due to stock buying on the strength of the 1955 lines which have been shown to a few suppliers. New model news, plus the corporation's determination, is supposed to have resulted in new strength in Chrysler shares.

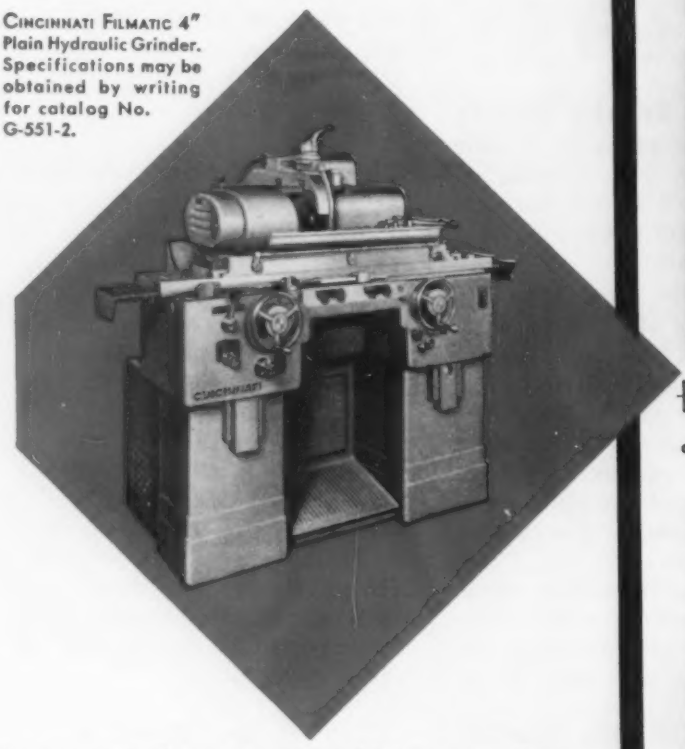
THE BULL OF THE WOODS — **By J. R. Williams**

IT'S OVER THERE -- WE'LL TAKE A SHORT CUT!
YES, YOU MUST SEE IT!
THAT'S THE SOFTENING WORKS--WHEN HE COMES UP HERE MAD OVER SOMETHIN', THEY KNOCK ALL TH' FIGHT OUT OF HIM FIRST!
BY TH' TIME THEY HAUL HIM THROUGH TH' CAST IRON JUNGLES AN' OVER SHEET METAL ALPS, HE'LL BE MAD AT HIMSELF FER COMIN' HERE!
9-10 J.R.WILLIAMS
THE PEACE MAKERS
Copr. 1954 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.

Precision Grinding Small Parts

at a very low cost

CINCINNATI FILMATIC 4" Plain Hydraulic Grinder. Specifications may be obtained by writing for catalog No. G-551-2.



In general, the cost of machining operations on small parts should be in proportion to the size of the part. Two examples of how this goal is attained with CINCINNATI FILMATIC 4" Plain Hydraulic Grinding Machines are illustrated here. Both are typical setups, one with standard tooling and the other with slight alterations on the machine to attain the highest rate of production at the lowest cost and minimum physical effort. Read how CINCINNATI FILMATIC 4" Plain Hydraulics contribute to these desirable results.

1) FILMATIC grinding wheel spindle bearings require no adjusting or maintenance.

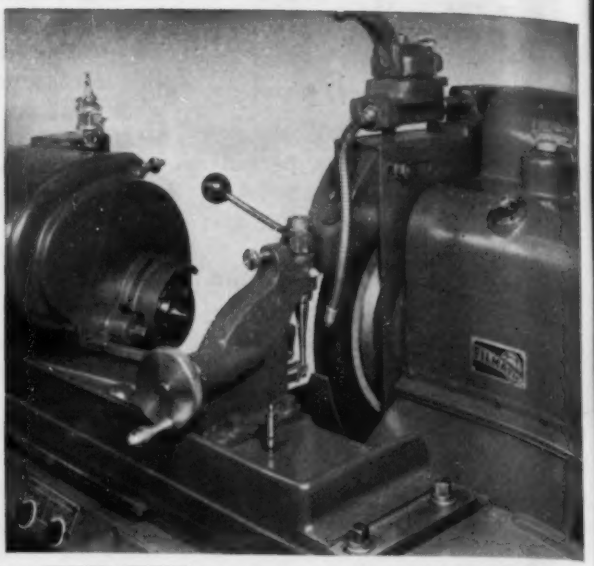
2) You can count on quick sizing within .0001", traverse or infeed.

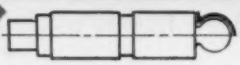
3) The bed is recessed so operators may be seated, yet all control elements are at their finger tips.

4) Automatic Infeed Attachment controls the complete grinding cycle.

You may obtain more data by writing for literature, or look in Sweet's Machine Tool Catalog for brief specifications.

CINCINNATI GRINDERS INCORPORATED
Subsidiary of The Cincinnati Milling Machine Co.
CINCINNATI 9, OHIO





Radius and adjoining face ground simultaneously. This 4" Plain Hydraulic Grinder features a solid table with a short angular section for the headstock, and a combination truing attachment.

Micrometer barrels, 200 per hour, grinding diameter and bevel simultaneously. This 4" Plain Hydraulic is equipped with work cradles, hydraulic footstock, automatic infeed, and special table type profile wheel truing.

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CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Expect Ike to Make Strong UMT Drive

If President's plan is approved by Congress all qualified 18-year-olds would have to sign up for military service . . . No exemption for college students, married men . . . Details on Seaway—By G. H. Baker.

♦ PRESIDENT EISENHOWER is readying an all-out drive for enactment next year of a universal military training law with some backbone to it. It's aimed at repairing some of the weakest spots in the existing draft law.

If present plans are approved by Congress, all physically and mentally qualified youths would be obliged on becoming 18 to sign up for military service. Some would enter the Army, Navy, or Air Force for 2 years' service. Others would train for 4 to 6 months and then be assigned to reserve units where they would attend lectures, drill, and summer camp.

Biggest loophole to be plugged would be ending the exemption for college students and married men.

Congress has always been skittish about voting a universal military training program, although opinion polls show that the public now favors some kind of UMT program. Probably Ike's recent grave warning that the Communist threat may last for 40 years has a lot to do with public acceptance of UMT. And congressional opinion, as is often the case, is lagging months behind the views of the voters.

End Military Cuts . . . Total strength of the Army, Navy, and Air Force is to be beefed up to about 3.4 million men by 1957, rather than trimmed to 2.8 million as had been planned earlier this year under the Defense Dept. "new look" plan.

Further paring down of Armed Forces has been definitely scrapped, as a result of the Administration's stiffened attitude toward Communism in Asia. Under present plans, the trimming of military units will stop next year, instead of in 1957.

For next year Air Force strength is slated to rise from its present level of 955,000 men to about 970,000. Army will be cut from about 1.4 million to about 1.1 million, and the Navy will be cut back from about 740,000 to about 690,000.

Details on Seaway . . . Now that civil engineers have succeeded diplomats at the St. Lawrence Seaway conference table, some concrete details of forthcoming construction plans are coming to light. Projects to be completed during the next 4 years include:

- Deepening the Welland Canal from 25 to 27 ft.
- Dredging in Lake St. Francis.

STEAKS enjoyed by President Eisenhower, ex-President Hoover.

- Construction of locks in the Soulanges area to pass vessels from the Beauharnois power canal into Lake St. Louis.
- Construction of canal and locks and channel enlargements at Lachine.
- Dredging in the Thousand Islands section.
- Canal and lock at Iroquois.
- Canal and locks near Barnhart Island.

Engineers estimate the seaway will be open by late 1958.

Save Needed Materials . . . Important dollar savings are being made, Defense Dept. discloses, as byproducts of its continuing program for conserving critical and strategic materials.

Naming a few examples, the Pentagon says refinements in the production of jet engine parts by Navy contractors are estimated to be saving $88 million yearly.

Improved packaging of one type of rocket is expected to lower Air Force costs by $4 million a year.

The cost of one type of ammunition for the Army was cut by $1 per round and another was trimmed by 57¢.

Considerable success through use of conservation contracts is reported. These are designed to encourage the supplier to review the desired item thoroughly to find means of reducing the content of scarce material.

With permission from the contracting agency, he may put into effect improvements which will increase conservation.

Stress Nickel . . . One of the

Up where eagles soar

ON WELDED RINGS OF STEEL

Today's jets soaring higher, faster, and farther are a tribute to the imagination and resourcefulness of the aviation industry. American Welding is proud to have contributed to this effort as a supplier of rings, bands and welded assemblies for every major U. S. aircraft engine manufacturer. In many instances, American Welding furnishes these completely finished — welding, machining and assembly all having been done in our plant. Our various divisions working closely with customers have developed new techniques and methods to keep pace with progress in the industry.

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With tomorrow's jets new problems involving fabricating will arise— American Welding stands ready to assist you. Write or call, we will be glad to study your problem.

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critical materials dealt with by conservation measures is nickel. Last year, there were 292 Defense Dept. projects in operation to save nickel.

They were aimed in part at reduction of nickel in armor plate, conversion from nickel-bearing to straight chromium stainless steel in food-handling equipment, and the use of boron steels in tank and automotive production.

Census:

Manufacturers will get questionnaires for business census.

Operations of some 300,000 manufacturing companies will be canvassed by mail next year in the new business census. Firms will be asked to report on payrolls, production, employment, consumption of fuel, power, materials and value added by manufacture during 1954.

The questionnaires, being drawn up by the U. S. Census Bureau, will be used to determine the level of business as part of the censuses of retail and service establishments, manufacturing, and the minerals and mining industries. For manufacturing, results will be compiled for the 450 types of industries by states, counties, and cities of 10,000 or more population.

Biggest task of the census takers will be surveying some 2.7 million retail establishments. Another 35,000 firms in mineral and mining industries brings to 3 million the number of questionnaires to be mailed out and spot checked.

Congress appropriated $8.4 million to start the project, and will be asked for another $5 million later for printing and distributing the results. Findings will be available to businessmen in 1956.

Simplify Census Form

Metalworking firms will find the forms they will receive early next year for the census of manufacturing simpler, easier to fill out directly from their 1954 books than those of earlier censuses.

The Census Bureau, as a result of a "bare-bones" appropriation, has reduced the number of questions on the forms and provided for less detailed answers. In addition, the new census forms have been tailored for different categories of business, instead of each business getting the same form and filling in only the applicable portions as in past years.

Influence Peddling

Legislation to stop "influence peddling" by making it a crime for a firm to offer jobs to government employees will be introduced again next January by Sen. Pat McCarran, D., Nev.

The bill, which was approved by the Senate Judiciary Committee in the closing days of the last session, would prohibit any firm from employing a government worker within 2 years after the worker had left a Federal post. It would permit hiring such an employee, however, if he had not had duties affecting the private firm or if he was returning to a firm with which he had previously been connected.

Work on Grand Plan

Recommendations on methods of carrying out President Eisenhower's suggestion for a $50-billion highway building program will be given to the White House by a new Advisory Committee on Highway Improvements.

Represented on the committee will be the construction industry, banking, labor, and other interests. Chairman of the group is Gen. Lucius D. Clay, chairman of the board of Continental Can Co.

The committee must report its proposals to the President before January, in order that he may present suggestions on highway building to the next session of Congress.

WASHINGTON NEWS

Emergency Controls

Industry members of the Commerce Department's National Distribution Council are fighting an uphill battle to block a drive to put the Council on record in favor of temporary price and wage controls in event of a new national emergency.

Led by retail representatives, the group at a recent Council meeting killed a move, presumably made in behalf of Commerce Secretary Sinclair Weeks, to have the Council urge the Secretary to take a pro-controls position in the future.

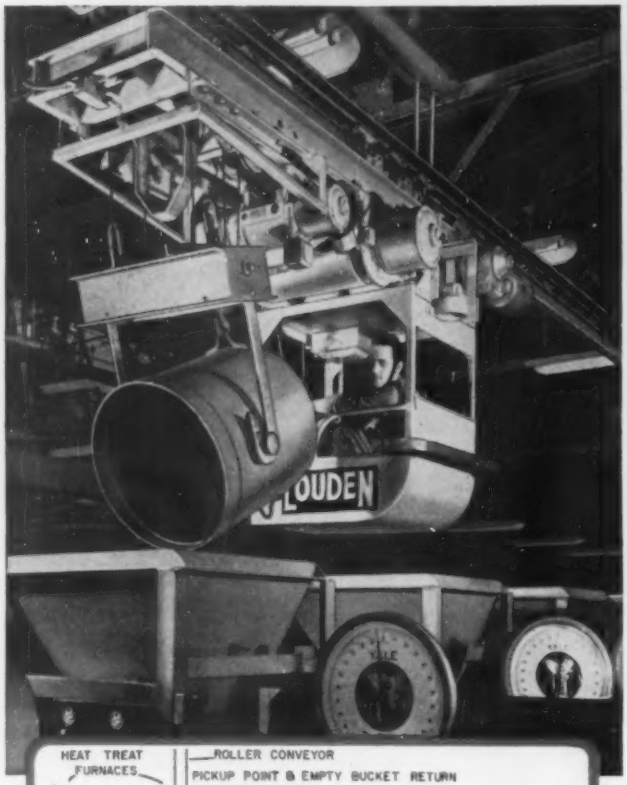
Although the resolution was later withdrawn, minutes of the meeting claimed that distributors would "not object" to temporary wage and price controls in event of an emergency.

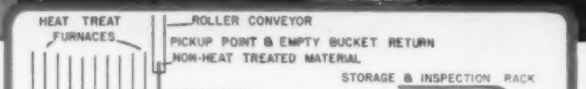
Want Korean Business

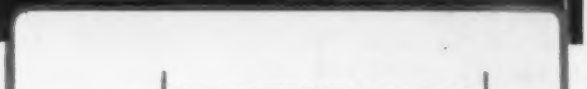
American firms interested in doing business in Korea should send their catalogs or brochures and export prices to Mrs. Nodie K. Sohn, Director of the Office of Procurement, Republic of Korea, 51-Chuksun Dong, Chongno Ku, Seoul, Korea.

NEW HEAD of Tennessee Valley Authority, Brig. Gen. Herbert D. Vogel, center, is congratulated by TVA directors Dr. Harry A. Curtis, left, and Dr. Raymond Paty at swearing-in ceremonies in Knoxville.

Parts for packaging or components for assembly?




HEAT TREAT FURNACES
ROLLER CONVEYOR
PICKUP POINT & EMPTY BUCKET RETURN
NON-HEAT TREATED MATERIAL
STORAGE & INSPECTION PACK
NORMALIZING FURNACES
WEIGH HOPPERS & PACKAGING MACHINES
AUTOMATIC MONORAIL TRACK SCALE
ROLLER CONVEYOR
BELT CONVEYOR TO SHIPPING
HEAT TREAT FURNACES DISCHARGE BOLTS INTO BUCKETS UNDER MONORAIL. LOADED BUCKETS ARE PICKED UP HERE AND DUMPED INTO WEIGH HOPPERS. EMPTY BUCKETS FOR HEAT TREATED BOLTS ARE RETURNED HERE.



Louden engineered overhead handling speeds and saves in many ways

Many plant executives have found a broad avenue to savings and production increases in Louden engineered Monorail and Crane systems . . . products of the longest overhead handling experience.

Above, left, a Louden cab-controlled carrier conveys heat-treated parts from furnaces to packaging machine hoppers. With handling overhead, furnaces are grouped closer together. Rehandling is eliminated. Machine non-productive time is cut. Much the same is true of the installation shown at the right where a Louden 5-ton crane is handling a component for final assembly in a screw thread machine factory.

Let Louden's long experience and complete line of equipment bring you the best solution to your handling problems.

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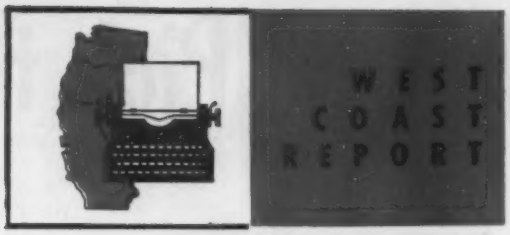
Since 1867—the first name in materials handling



Aircraft Stretch-out Hits Tool Shops

Phased-out airframe production plus do-it-yourself trend of big aircraft firms has tool and die men worried . . . Small subcontract shops have 75 pct of eggs in aircraft basket—By *R. R. Kay.*

♦ STRETCHED-OUT Pentagon programming in the West Coast airframe manufacturing industry is hurting small firms clustered around the prime producers. Many tool and die shop operators and manufacturers of aircraft parts are singing the blues.

Prospects aren't bright for the small shops. Right now, this is what they see; production programs on some airplane models phasing-out; less need for spare parts manufacture; and, most telling, major airframe producers doing more of the work they used to farm out.

A check by THE IRON AGE shows it is a fact that, with the pressure off, more and more work previously subcontracted is now done by the airframe manufacturers in their own plants. Production equipment ordered a year ago is now in use. Projects are sometimes shifted from one plant to another to keep employees going and the work in the corporate family. This is a definite trend, and it looks as if it will continue, unless the U. S. is again forced to speed up aircraft production.

Backlogs Have Shrunk . . . Backlogs are dwindling for the 150 Southern California tool and die shops who do about three-fourths of their $79 million annual business for the airframe companies. Most tool and die shops here, with seldom less than a 2-month backlog, now report only 3 weeks' work.

American Society of Tool Engineers' national secretary, Wayne Ewing, president, Arrowsmith Tool & Die Corp., Los Angeles, told THE IRON AGE, "Business in Southern California shops today is 30-35 pct below last year, while the national average is 20-25 pct below. Stretchout gave the signal for cutting job shops off altogether instead of cutting them back by the same percentage as the prime contractor."

Small parts-makers are raising their voices through two associations recently formed to seek relief. Leaders of the groups agree things may get worse the next six months, or at least until government contracts are let for next year's airplane production. Meanwhile, a few firms have merged; others are talking about it.

More Uranium Development . . . $9 million cash was paid for the Pick uranium mine in southeast Utah. This is the third uranium property acquired by Atlas Corp. this year. Atlas will buy equipment immediately to mechanize. Company is studying plans to build a mill close to the mine to cut transportation costs and make possible mining of even lower grade ores. Some geologists consider the property one of the three largest in the Colorado plateau.

Western Pyromet Corp. (see THE IRON AGE, Aug. 26, 1954, p. 63) will pay the government $2,000 per month during its 9 to 12-month shakedown period at the former Kaiser Manteca, Calif., magnesium plant. The company will use 32 of the 232 retorts and two of the 64 furnaces. If all goes well, Western Pyromet will get a 10-year lease on the whole works.

The U. S. Lithium Co. organized to exploit lepidolite reserves near Gunnison, Colo. Salt Lake City and Denver business men make up the company . . . Armco Drainage & Metal Products, Inc., started building a $100,000 facility in Arizona.

OATH OF OFFICE is taken by Clarence A. Davis, second from left, as he becomes new Undersecretary of the Interior. With him is Mrs. Davis and Interior Secretary Douglas McKay of Oregon, right, Judge H. A. Stephens, left.

How to Pick the Right Cutting Oil

WORD OF MOUTH?
It gives you the answer sometimes, but not many of your friends have the same cutting oil requirements and the same problems that you have. It's much surer to depend on specialists like Sun.

LABORATORY ANALYSIS?
Sure. But there's no formula for correlating the laboratory analysis with how well the cutting oil will work on your job. It takes years of field experience like Sun's to help you make the right choice.

ELABORATE SHOP TEST?
This will probably give you the answer. But it's expensive and interferes with production when you try to test all the oils available. Sun's experience can help keep your shop-testing to a minimum.

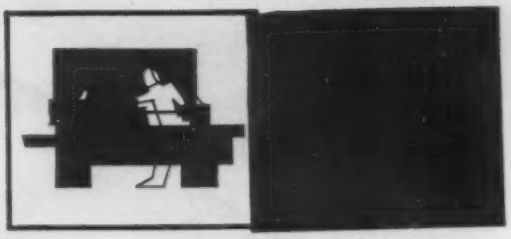
EXPERIENCE IS THE ANSWER.
And Sun has it. Its field representatives have probably come across problems similar to yours many times. If they haven't, its cutting oil specialists and metallurgical technicians are ready to help with your problem.

Soluble or straight, transparent or black, light or heavy duty—Sun makes the kind of cutting oil you need to handle your job at the lowest cost. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-9.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL
Refiners of famous High-Test Blue Sunoco Gasoline



Tool Shipments Off $100 Million

Machine tool shipments in first half '54 totaled $538,350,000 . . . Total for same period last year was $639,550,000 . . . Hope for pickup from new tax revision . . . Gear index rises 10.9 pct—*By E. J. Egan, Jr.*

♦ WITH ONLY SLIGHT help from foreign customers (8.3 pct) and from dwindling U. S. Government purchases, shipments of American made machine tools still totaled $538,350,000 for the first 6 months of 1954. In the corresponding 1953 period, shipments added up to $639,550,000, fell off to $551,650,000 in the second half of 1953.

The first half 1954 showing represents substantial machine tool buying for replacement purposes in U. S. metalworking industry, according to NMTBA Cleveland headquarters. And industry spokesmen are confident this trend will be stepped up now that final passage of new tax laws is a reality.

Expect More Orders . . . Healthy shipment schedules since the first of the year indicate that some machine tool replacement program were activated in anticipation of the new accelerated depreciation rulings. Other long delayed plans for new equipment are expected to be inaugurated on a wider scale as terms of the revamped tax provisions become more familiar to machine tool buyers.

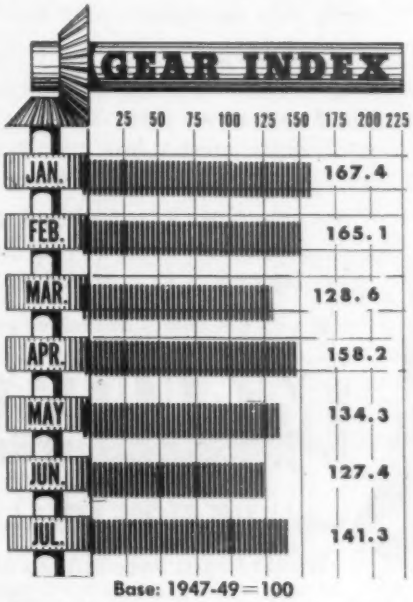
With the expected pickup in defense business still in the planning stage, builders are bearing down on a somewhat novel sales pitch. Its theme: "We are in a position to give immediate consideration to your machine tool requirements."

Ready Tool Show . . . Plans for the 1955 Machine Tool Show in Chicago are progressing on schedule. Show will run for 12 days from Sept. 6-17. To accommodate as many National Machine Tool Builders' Assn. member exhibitors as possible, another large building will be constructed adjacent to the present International Amphitheater on Chicago's South Side.

A recent communique from NMTBA headquarters to exhibitors concerns the color of paint to be used on their machine tool displays. An accompanying ballot sheet requests builders to vote on their color preferences among the standard machine tool light gray, a light blue gray, or a Vista green.

Rainbow Tools . . . Majority rule will presumably decide whether builders will be restricted to a single one of the three suggested colors, be able to use any of the three they prefer, or have complete freedom to paint equipment any color of the rainbow.

Widest possible use of color has been suggested as a means of varying and improving overall appearance of the show. Claim is it will emphasize the fact that for the most part, machines will be of new design. However, a consensus of early opinion would seem to rule out any possibility of exhibitors using the much publicised "color dynamics" treatment and "three dimensional seeing."



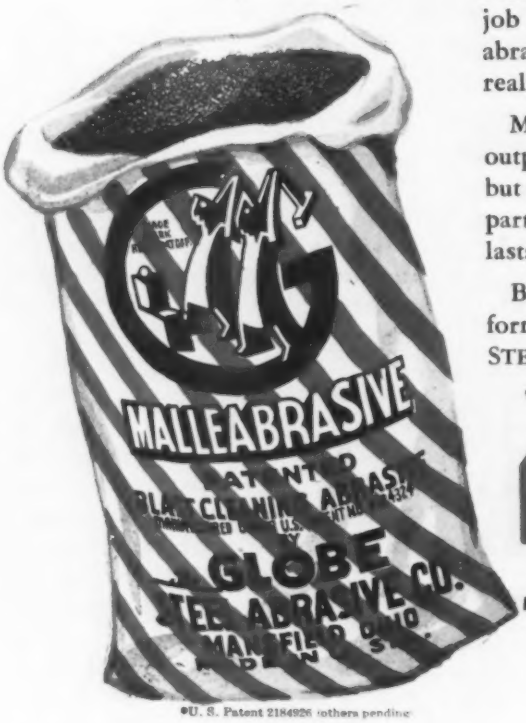
Source: American Gear Manufacturers Assn.

Automation Show . . . Interested show visitors will find still another test for weary arches and catalog-laden arms. A Production Engineering & Automation Exposition will be held at Chicago's Navy Pier, coinciding exactly with the Machine Tool Show dates. This will be an independent project, not officially affiliated with or sanctioned by NMTBA.

The companion show will have the builders' blessing, however. Space on Navy Pier will be available to accommodate non-NMTBA builders and manufacturers of machine tool accessories.

Gear Index Up . . . Early summer vacation schedules seem to have had no adverse effect on business in the gearing industry. Latest index of business volume from the American Gear Manufacturers' Assn. shows a 10.9 pct increase for July, as compared with the June report. July index figure is computed at 141.3; preceding month's mark was 127.4.

HOW TO PUT THE SQUEEZE ON BLAST CLEANING COSTS



*U. S. Patent 2184926 (others pending)

More and more shop foremen . . . superintendents . . . men whose job is getting work out fast at less cost, are replacing their old abrasive with Malleabrasive. And they're finding that Malleabrasive really puts the squeeze on blast cleaning costs!

Malleabrasive cleans perfectly—leaves a gleaming finish. Your output is increased because not only does Malleabrasive clean faster but it saves down-time. And your costs go down . . . you have fewer parts replacements, less maintenance. What's more, Malleabrasive lasts longer, which means fewer abrasive purchases.

But why talk about it? Try it and see for yourself. For more information or the name of your nearest distributor, write to GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

"If you use metal abrasive, you *should* use Malleabrasive."

MALLEABRASIVE®

MADE BY THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO

World's largest manufacturers of Malleablized Chilled Iron Shot and Grit
Established 1907

The Iron Age SALUTES

Herbert G. Murrer Frustrated in his ambition to become a concert pianist, he entered the tool and die business, now heads his own firm and industry association.

You might think that a young man whose chief ambition was to become a concert pianist would get rather discouraged when he ended up in a Cincinnati tool shop. But Herb Murrer is not the type that discourages easily. The more than 900 members of the National Tool & Die Manufacturers Assn., who have reaped the benefits of his vigorous leadership during the past year, are thankful that Herb's promising musical career had to be abandoned because of lack of funds for advanced study.

In 1912, Herb became an apprentice machinist. He learned so quickly that during World War I he was able to take charge of a shrapnel shell plant. He later worked in various jobbing shops throughout the Cincinnati area. In 1922, Herb took a job in a tool and die shop, now Murrer Tool Co., Inc., and in 1924—at the age of 25—became a partner in the five-man firm.

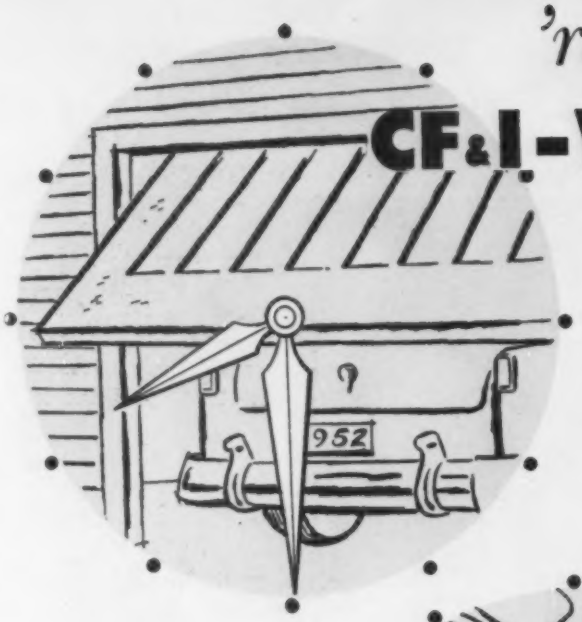
During the depression he bought out his partner. As managing owner, he has kept the shop thriving ever since. Herb believes his Murrer Co. is the oldest tool and die shop in the Cincinnati area and one of the oldest in the industry in continuous operation under the same management.

Always outspoken and keenly interested in organizations, Herb is a natural leader. He served as president of the Cincinnati Kiwanis Club at 35, president of the Dayton Tool & Die Manufacturers Assn. at 37, and has been a member of the board of the Cincinnati Industrial Institute and other allied associations.

Herb has been a consistent proponent of bigger and better apprentice training programs in his industry. A few years ago, at an NTDMA meeting, he took modern parents to task for insisting that their sons go into professions rather than trades. He asserted that there is dignity in industry too. His remarks were widely publicized, and a Los Angeles woman countered with the experience of her two sons who wanted to become toolmakers but could not find a shop that would train them. The association had already made plans for a concerted drive to expand the training facilities of every shop; the Los Angeles experience merely served to magnify the problem for hesitant shops.

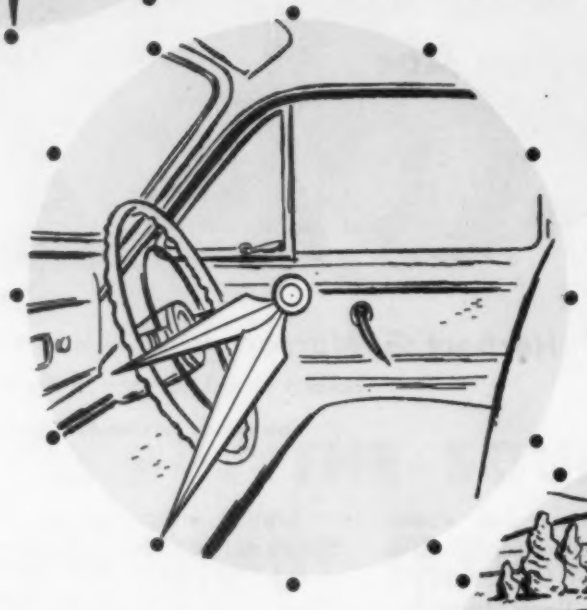
In addition to his organization work, Herb likes traveling, reading and "just plain conversation." He's an excellent golfer and a fine photographer, as well as an accomplished pianist.

'round the clock with
CF&I-WICKWIRE WIRE

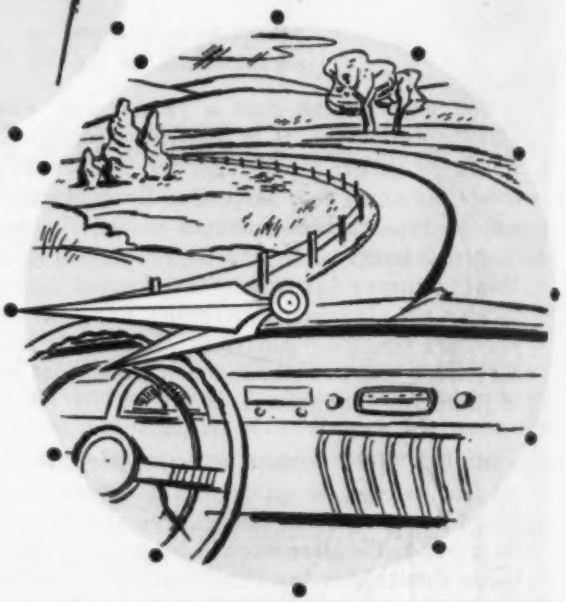


In this advertisement we continue to take you through a typical day in the life of John Q. Citizen . . . showing you the part CF&I-Wickwire Wire plays in his everyday activities. Our last advertisement took us through John's bedroom, the nursery and the kitchen.

garage—8:30 a. m. A lucky fellow, John rides to work every day in his car. This is his garage. Notice that it has a smooth-operating overhead door. What makes it swing up? A large spring. And—you guessed it—it's made from CF&I-Wickwire Wire.



automobile — 8:35 a. m. CF&I-Wickwire Wire contributes much to the comfort and efficiency John gets from his car. There's wire in the springs of the seat and back cushions. Under the hood in the valve springs and the starter spring—to mention just a few of the places where wire is used.



highway—8:45 a. m. Notice the ribbon of concrete over which John's car rides smoothly to its destination. Many people, just like John, fail to realize that what holds it together is Welded Wire Reinforcement Fabric—another of the products that use CF&I-Wickwire Wire.

Watch for the balance of John's day in succeeding advertisements that take him to his office, through his plant and finally home to the relaxation of his living room.

FOR THE WIRE YOU REQUIRE - CHECK CF&I-WICKWIRE

CF&I-WICKWIRE WIRE
THE COLORADO FUEL AND IRON CORPORATION

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston
Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita

2601

The Iron Age INTRODUCES

JAMES F. CLARK, elected president, ACF Industries, Inc., New York.

F. T. BARTON, named vice-president-Special products and services, Jones & Laughlin Steel Corp.

CONDE HAMLIN, elected vice-president-Sales and a director of DeWalt Inc., Lancaster, Pa.

CHARLES P. McCABE, appointed assistant vice-president-Operations, Republic Steel Corp., Cleveland.

J. R. Millar, board chairman, elected acting president, **National Automotive Fibres, Inc.,** Detroit; and **William J. Athanson,** elected a director.

Frank J. Kennedy, vice-president and secretary, made administrative assistant to the president, **The Electric Auto-Lite Co.,** Toledo.

J. Robert Pauline, appointed vice-president, Kellogg Div., **American Brake Shoe Co.,** New York.

Peter Robertson, appointed vice-president in charge of planning and development, **Republic Steel Corp.**

Bernard J. Langford, appointed assistant traffic director, **Chevrolet Motor Div.,** Detroit. He succeeds Warren H. Hines, who has retired.

Harold J. Mock, appointed executive vice-president, **General Metals Corp.,** and general manager, Adel Precision Products Div.

Dr. Frederick E. Terman, elected to the board of directors, **Ampex Corp.,** Redwood City, Calif.

Allen M. Shore, appointed sales engineer for testing equipment, Philadelphia office, **Baldwin-Lima-Hamilton Corp.**

William B. Billingsley, named maanger new Pennsalt Chemical of Canada, a new **Pennsylvania Salt Mfg. Co.** division.

Robert J. Cole, becomes Pacific coast manager, Construction Materials Div., **John A. Roebling's Sons Corp.**

George Tischer, appointed general sales manager, **McLouth Steel Corp.; William J. Cleary, Jr.,** becomes assistant general sales manager and **W. A. Adamson,** becomes manager of stainless sales.

Richard E. Coulter, named manager of the Credit Dept., **Aluminum Co. of America,** New York.

Robert W. Bowles, named manager, specialty steel sales, **Kaiser Steel Corp.,** Oakland, Calif.

Clinton H. Johnson, appointed sales engineer, Electrostatic Precipitators, Chicago district office, Metal Products Div., **Koppers Co., Inc.**

Robert Keach, appointed manager, Industrial Rubber Div., **Thermoid Co.,** Trenton, N. J.

Stephen W. Berges, named district sales manager in charge of New England Area, **A. R. Purdy Co., Inc.**

Richard J. Zobel, appointed Philadelphia district manager, **Sterling Electric Motors, Inc.,** Los Angeles.

George Reach, promoted to assistant to the sales manager, **Cleco Pneumatic Tool Co.,** South Central Sales Div., Houston.

John W. Gibb, becomes sales manager, Chicago area, **C. A. Roberts Co.** He succeeds C. T. Johnson who has retired.

Robert W. Henson, appointed chief of flight test, **Ryan Aeronautical Co.,** San Diego.

Clarence R. Mitchell, appointed hot strip superintendent, Granite City Steel Co., Granite City, Ill.

G. Gordon Lloyd, appointed combustion engineer, Allenport, Pa., Works, **Pittsburgh Steel Co.**

Charles E. Shell, appointed assistant to the plant manager, John Volkert Metal Stampings, Inc., Queens Village, N. Y.

Robert J. Ely, appointed assistant chief metallurgist, **American Brake Shoe Co.,** New York.

Ray J. Dervey, appointed general sales manager, **American Hoist & Derrick Co.,** St. Paul, Minn.

Nelson L. Hammell, appointed sales manager, Gripper Arm Program, **Rheem Mfg. Co.,** Philadelphia plant.

John V. Boardman, becomes general superintendent, **Green River Steel Corp.,** Owensboro, Ky.

Joseph H. Myers, becomes assistant general superintendent, Riverdale Plant, **Acme Steel Co.**

Walter M. Gibbs, Jr., appointed sheet product manager, **Kaiser Aluminum & Chemical Sales, Inc.**

Herman L. Weckler, elected general manager, **Clevite Corp.,** Cleveland.

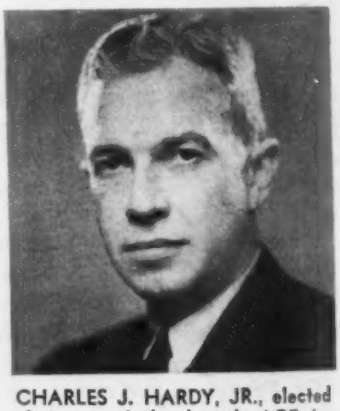
Allan M. Cameron, appointed general manager new Research & Development Dept., Metal Div., **Continental Can Co.,** New York.

Richard S. Purinton, appointed defense products manager, **Harris-Seybold Co.,** Cleveland.

John A. Neyenhouse, Jr., appointed assistant district manager, United States Steel Supply Div., of **U. S. Steel Corp.,** at Newark, N. J.

W. H. BLACKBURN, appointed assistant to the president, The Billings & Spencer Co., Hartford.

M. A. WILLIAMSON, elected chairman and publisher, American Metal Market, New York.



CHARLES J. HARDY, JR., elected chairman of the board, ACF Industries, Inc., New York.

E. J. STONER, appointed comptroller, Amplex Div., Chrysler Corp.

Save Money!
Save Fingers!
SECOND FINGER $1,050.00
FIRST FINGER $1,200.00
THIRD FINGER $750.00
FOURTH FINGER $600.00
ENTIRE HAND $5,100.00
THUMB $2,100.00
Cost of Amputated Fingers
It pays to keep fingers out of presses!
AIR BLAST VALVES
Eject parts at each stroke of Press. PRICE $29.00
PRES-VAC SAFETY FEEDERS
Blanks are fed to a press from a safe distance of 14 inches. PRICE $35.00
Prices F.O.B. Plant
F. J. LITTELL MACHINE CO.
Speed with Safety
Write for FREE Catalog
AIR DIVISION
4141 RAVENSWOOD AVENUE
CHICAGO 13, ILLINOIS
District Offices: DETROIT and CLEVELAND

"Samples from the Furnaces." Agnes Potter Lowrie, famed artist daughter of a noted steelmaker, portrays a closeup of familiar objects at testing time: the protective blue glasses through which old-timers visually estimated temperatures; the slag spoon and mold for physical and chemical control of steel quality. Limited edition of 15 x 18 color prints available soon. Complimentary copy on request.

The Fine Art of Steel Making #III

Why, during World War II, were American steel makers with the greatest production capacity in the world fearful of shutdowns?

The Achilles Heel of the industry was palm oil. Then considered the essential lubricant for cold rolling tin plate, palm oil was obtainable only from foreign sources and had to be shipped halfway around the world.

That this danger has now been eliminated is due to the ingenuity of American research coupled with the readiness of steelmen to adopt new and better products and processes.

Almost 3 years ago Ironsides announced Palmoshield as the first domestic replacement for imported palm oil. Within six months two-thirds of our major tin plate mills were using or testing it, often with remarkable results. For example, one company stepped up production 15% with no additional investment, no increase in labor, and no change in mill operation.

Recognized as today's most significant advance in lubrication, Palmoshield offers five distinct advantages:

1. Produced in the heart of the steel industry. Users need not stockpile.
2. Made from freely available domestic materials.
3. Subject to exact chemical control—free fatty acid content to within ½%.
4. Price is not artificial, but fluctuates freely with the domestic fat market.
5. Proved in production to deliver increased tonnage at less cost.

Ironsides research, which developed Palmoshield, is now geared to the future. A flexible team—the "custom tailors" of lubrication—Ironsides engineers are available for technical assistance on special problems of any nature or size. A letter will summon them without obligation. Address The Ironsides Company, Columbus 16, Ohio.

SHIELD PRODUCTS

Ironsides

By the makers of Palmoshield • "the palm tree that grows in Ohio"

This Holcroft Book belongs in YOUR Technical Library

"We are going to invest in our own heat treat furnace. Where should we start—what furnace facts should we know?"

"Do we know the difference between 'direct' and 'indirect' firing?"

"Do we know all the methods of handling stock, and which would best suit our needs?"

Questions like these are best answered by a manufacturer who specializes in building furnaces for specific jobs. You'll find the answers—compiled from a world of experience—in Holcroft's book "Blazing the Heat Treat Trail."

For example, there's a frank discussion of all of the basic factors that govern the selection of a furnace: the fuel to use, a discussion of open firing versus controlled atmospheres, an illustrated section on stock handling, and suggestions as to how your heat treat process can be tied right into the production line.

This book represents the type of industry service that stamps Holcroft as its leader. As continuing sources of information, future advertisements will further describe different furnace types and methods of handling stock.

You'll find it's a good bet to come to Holcroft first!

Want a copy of this book for your files? Just write—right now!

Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Michigan.

HOLCROFT & COMPANY DETROIT, MICH. PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

6545 Epworth Blvd. Detroit 10, Michigan

CHICAGO, ILL. CLEVELAND, OHIO HOUSTON, TEXAS PHILADELPHIA, PA.

CANADA: Walker Metal Products, Ltd., Windsor, Ontario EUROPE: S.O.F.I.M. Paris 8, France

Joel Thompkins, transferred to the central electrical engineering dept., Pittsburgh, **Aluminum Company of America;** and **Hazen E. House,** becomes chief of the Electrical Div., Aluminum Research Laboratories at Massena, N. Y.

Louis E. Schumacher, appointed assistant sales manager, Plains Div., **Caterpillar Tractor Co.,** Peoria.

H. V. Beasley, is in charge of new Constructional Alloy Steels Section, Development & Research Div., **The International Nickel Co., Inc.; Clarence H. Sample,** becomes head Electroplating Section; **T. E. Kihlgren,** is in charge of new Inco Nickel Alloys Development Section; and **Dr. V. N. Krivobok,** is head of Stainless Steel & Heat-Resistant Alloys Section.

James D. Fraser, appointed to Foundry Sales Dept., **The C. O. Bartlett & Snow Co.**

Leslie Carlson, appointed chief tool designer, **McCulloch Motors Corp.**

James T. Karabasz, appointed general manager, **Luria Steel Supply Co., Inc.,** Bethlehem, Pa.

L. C. Schweitzer, appointed assistant general manager, TOCCO Div., **The Ohio Crankshaft Co.,** Cleveland.

OBITUARIES

Joseph H. Roberts, chairman of the board, **Edgcomb Steel of New England, Inc.,** recently.

James F. Ferguson, 54, vice-president and sales manager, **General Box Co.,** Des Plaines, Ill., of a heart attack, recently.

Edgar W. Hussey, 50, district manager, **Soule Steel Co.,** suddenly at his home.

Erich C. Wollaeger, 62, manager, Cleveland and Cincinnati offices, **The Oilgear Co.**

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Start with design—

How to Prevent Stress-Corrosion-Cracking in Aluminum Parts

Part I

By R. N. Hooker, Metallurgist

J. L. Waisman, Asst. Chief Metallurgist

Douglas Aircraft Co., Inc.
Santa Monica, Calif.

◆ Susceptibility of some aluminum alloys to stress-corrosion-cracking can often be minimized or eliminated . . . Improved design can take advantage of operations favorable to stress elimination . . . Forgings may be used in preference to machined or heavily formed parts . . . Stress levels should be kept low to eliminate stress-corrosion cracking.

◆ STRESS-CORROSION cracking in parts made from some aluminum alloys can often be eliminated by removing one of the conditions, either stress or corrosion, which leads to failure. Usually this may be done by keeping stress at a low level. Where stress conditions cannot be altered, parts must be treated to protect the metal from corrosion.

Redesign to prevent stress buildup after assembly, use of properly fitted components in assembly, and protective coatings to prevent air-metal contact are methods used by Douglas Aircraft Co., Inc., Santa Monica, Calif., to eliminate stress-corrosion cracking. The company's program of testing and research has led to more effective control of stress-corrosion cracking problems.

The high strength aluminum alloys containing zinc, copper, and magnesium, such as 14S,

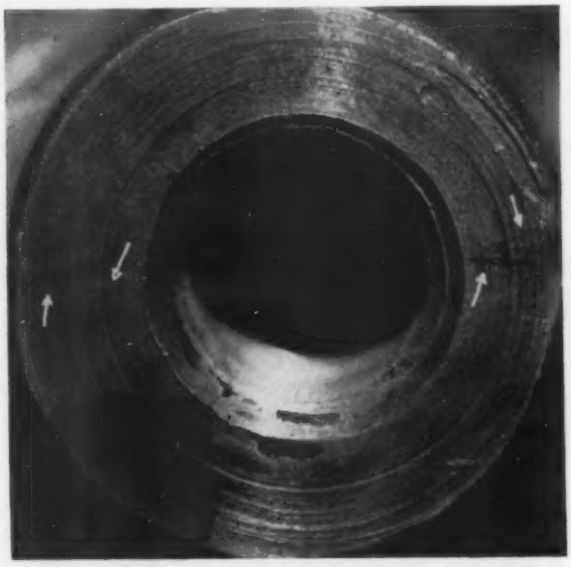


FIG. 1—A tapered fitting caused this 14S-T6 hydraulic forging to fail. "Built-in" stresses were developed to about 20,000 psi. Problem was corrected by use of a straight fitting.

EDITOR'S NOTE: Part II of this article will appear in the Sept. 16 issue. It is based on a paper presented by the authors at the Western Regional Meeting of the National Assn. of Corrosion Engineers at Los Angeles.

Cracks caused by interaction of corrosion and a steady stress are usually intergranular . . .

24S, and 75S, consist of phases which differ in electrolytic activity. Under some conditions the electrolytically anodic phases may distribute themselves in a more or less continuous network leading to susceptibility to stress-corrosion cracking under adverse circumstances.

Fig. 1 shows a 14S-T6 hydraulic forging which developed stress-corrosion cracking in service. Cracking, in a boss adjacent to a hole, was due to stress produced by insertion of a tapered fitting. Fig. 2 is a photomicrograph of the crack. Tests showed a built-in stress of approximately 20,000 psi was developed. Corrective action in this case was to replace the tapered fitting with a straight fitting.

Fig. 3 shows a 75S-T6 fitting fabricated from an extruded bar which developed longitudinal cracks in service. Fig. 4 is a cross-sectional microscopic view of this fitting. The responsible stress was produced during assembly. Corrective action was to replace the fabricated parts with a forging.

Cracks caused by interaction of corrosion and a steady stress will usually be intergranular. However, it is sometimes difficult to identify a service crack as being of this type.

In extruded material the crystalline structure is fragmented, and distinct grain boundaries are not visible microscopically. In wrought forms the start of a crack may be intergranular, then after some propagation, stresses may become high enough to continue the crack by static or fluctuating stress with corrosion being only a minor factor. Thus a large portion of the final fracture may not be intergranular.

Cracking in stress-corrosion cracking is largely around the grains. At a given stress level and environment characteristics which can affect the start of stress-corrosion cracking include: Alloy composition and form; quality of heat treatment; size of the raw stock section; location in a section from which a part is made; direction of stressing with respect to rolling direction of wrought material.

FIG. 2—Photomicrograph of forging in Fig. 1 shows failure of part by stress-corrosion.

An alternate-immersion testing method, using a solution of 3½ pct sodium chloride in tap water, has proved useful in making accelerated tests of stress-corrosion cracking. This test has been in use for several years by the Aluminum Co. of America. The solution is maintained at a specific gravity of 1.023 and used at a room temperature. Test results are primarily useful in comparing materials, methods of protection, and effects of stress, and compare favorably with long time exposure tests.

Stress level affects time to failure

Stress-corrosion cracking occurs only in the presence of a tensile stress and the stress magnitude has a marked effect on time required for cracking to begin. A very small drop in stress level results in a large increase in time to failure. Also, the stress for an indefinite life is different for different environments. Different lots of the same form, gage, and alloy composition show different stress levels for an indefinite life.

Small "T" extrusions of XA78S-T6, anodized and unanodized, were stressed transversely. The "threshold stress" for an indefinite life in the alternate immersion test for both anodized and unanodized samples of this extrusion was found to be somewhat less than 40,000 psi.

Other characteristics influence the time required for cracking. One factor is the direction of stressing relative to the rolling or extruding direction. The aluminum alloys have maximum resistance to stress-corrosion cracking in the longitudinal direction and minimum resistance in the short transverse direction. For a given direction heavy sections are more susceptible to cracking than light sections and the centers more susceptible than surfaces.

For a heavy extruded bar tested at the yield strength, alternate immersion tests show the average life for the short transverse direction to be 1 week, and for the long transverse direction 2 weeks, while a thin extrusion showed an average life of 10 weeks before cracking was observed.

Good assembly matching needed

Many high level residual stresses may be produced in force-fitting during assembly. Design tolerances must be such that reasonably good assembly matching can be obtained. The design should provide adjustment in assemblies where cumulative tolerances can cause mismatch. Fabrication inspection must guard against out-of-tolerance parts causing misfits.

Residual stresses can also be produced by

FIG. 3—Extruded 75S-T6 fitting failed in use due to stress set up by assembly mismatch.

forming and heat treating operations. Both tensile and compressive stresses can be developed through the thickness of a plate by room-temperature forming. One surface may develop a residual tensile stress. The interior may also develop stresses. These may be exposed to the surface by subsequent machining. Stresses as high as 60,000 psi can be developed in certain sections.

Experimental work on the stresses developed during heat treatment are not sufficiently advanced to present quantitative data. However, for simple shapes the surface stresses produced are compressive for the aluminum alloys and therefore favorable. It is well to quench some forgings in hot water, providing this testment does not decrease mechanical properties excessively. This avoids large residual tensile stresses in the interior that might be exposed by machining into the interior of bulky parts.

To minimize high residual forming stresses, operations should be carried out in the soft temper whenever possible so that the stresses are relieved by subsequent heat treatment. When forming in other tempers, stretch forming, which produces a low level of residual stresses, is suggested. Other operations should be restricted in severity or performed warm to keep residual stresses at a low level.

Other approaches to the solution of this problem lie in selection of material forms and shapes less susceptible to stress-corrosion cracking. This may be done by using die forgings rather than machining parts from solid stock, by using a raw stock section as small as possible. Reheat-treating after appreciable amounts of material are removed by machining is also helpful.

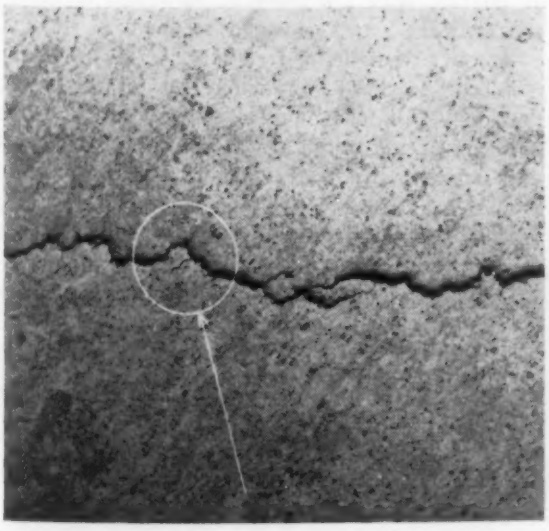
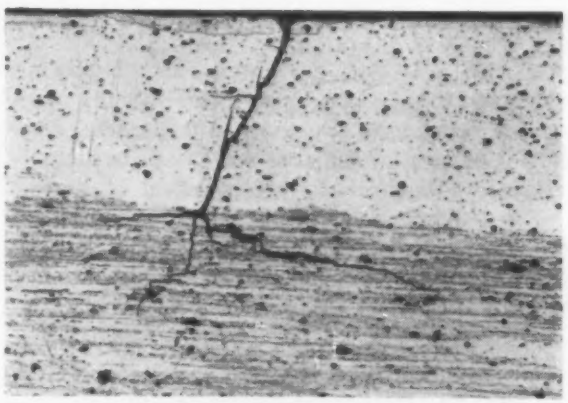
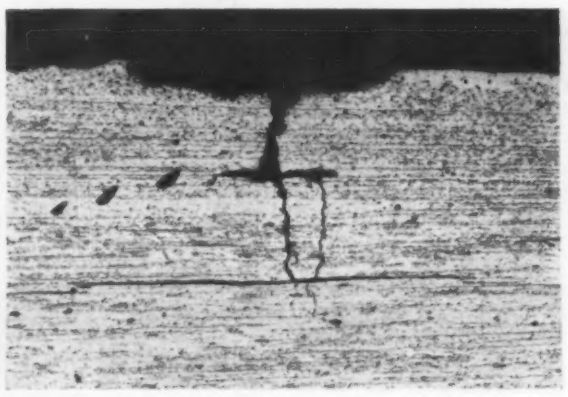


FIG. 4—Photograph of crack (Fig. 3) shows part failed due to stress-corrosion-cracking.



TYPICAL stress-corrosion crack in XA 78S-T6 extruded material. Cross-section. 100X.



TYPICAL stress-corrosion crack in 75S-T6 extruded material shown in cross-section. 100X.

Powdered Metal Electrodes Cut Welding Costs, Gain Wider Acceptance

By A. C. Ward Welding Dept., General Electric Co., York, Pa.

◆ Welds of good quality at lower overall cost substantiate some early claims made for the contact or powdered metal electrode ... Smooth, uniform welds can be made easily by operators with little training.

◆ Since the speed of welding with the powdered metal electrode is about twice that with a conventional electrode, less distortion can be expected . . . Nearly all contact electrodes now made are for flat and horizontal welding.

◆ The E-6012 and E-6020 classifications have been approved by some regulatory agencies . . . These electrodes are recommended for use on auto parts, barges, boats, truck bodies and trailers and similar assemblies.

◆ MANY CLAIMS have been made regarding the potential of powdered metal welding electrodes. Some have been substantiated, some have not. However, when used for the proper applications, these electrodes give excellent results.

These electrodes are presently classified by electrode manufacturers according to existing classifications of the American Welding Society and American Society for Testing Materials. The limitations of these classifications are recognized, but the new electrodes lend themselves readily to these classifications with few exceptions.

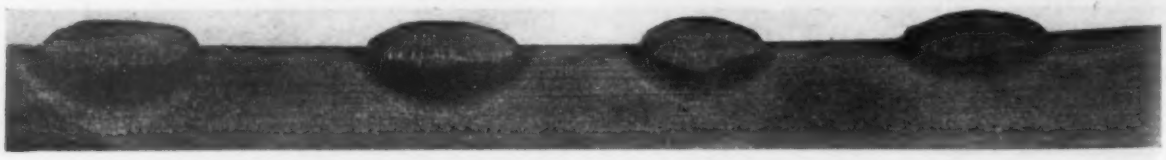
Most powdered metal electrodes are classified as E-6012, E-6020, or E-7020 type. They are recommended for use on auto parts, barges, boats, ships' doors and hatches, structural steelwork, trailers, truck bodies, and similar applications. The E-6012 and E-6020 types have been approved by the American Bureau of Shipping, Coast Guard, and ASME Boiler Inspectors.

Nearly all powdered metal electrodes introduced thus far have been designed for flat and horizontal welding only. It is estimated that 80 pct of the E-6012 type are used in these positions and all of the E-6020 type are used in flat and horizontal work. Therefore, the limitations on these electrodes, according to usability, are not great.

The initial arc is struck with the new electrode by simply laying the end of the coating on the work. When the base metal starts to melt, the electrode is held in place until a well defined puddle forms. Most operators keep the coating in contact with the work at all times to insure uniform arc length and reduce operator fatigue.

After a well defined puddle has formed, the electrode is tilted forward about 30° from the vertical. This lead angle prevents the slag from running ahead of the arc as the weld progresses and helps to produce a smooth, uniform, finely rippled bead, free from undesirable notches. The rate of forward travel is about twice that for a conventional electrode.

Welds made with the new E-6012 type elec-



CROSS-SECTION of weld made with the new E-6012 electrode (extreme right) does not differ much in area from welds made with E-6020, E-6013 and E-6012 standard electrodes.

DEVELOPMENT OF POWDERED METAL ELECTRODES

Metallic substances have been added to electrode coatings for many years. As early as 1908, Kjelberg introduced a coating containing potassium salts to make alternating current welding possible.

Later, most electrode manufacturers added all types of metallic ingredients to the coatings to improve arc stability and alloy the weld deposit.

About the same time, the conventional "hot rod" containing iron oxide in the coating was introduced.

After World War II, a European firm announced the manufacture of the contact electrode which contained large additions of iron powder in the coating. Although sold in the United States, these electrodes were not widely accepted.

In late '53 and early '54, American-made powdered metal electrodes were introduced and have been well received by the welding industry.

trode are very satisfactory. Their profile and contour are similar in many ways to those made with a conventional E-6020 electrode. Penetration with the new electrodes is comparable to that of the conventional E-6012 types.

The cross-sectional area of welds produced with the powdered iron type electrodes is smaller than that produced with some standard electrodes. This factor must be evaluated on each application. In some cases, this will save material and time, whereas in other cases it may sacrifice structural strength.

Originally, there was some speculation as to whether the new electrodes would produce welds of acceptable quality to meet existing specifications. Physical tests for tensile strength, yield point and elongation show that these electrodes can give good results when used under the proper conditions.

About 30 pct more welding current can be used on a powdered metal electrode than on the equivalent diameter of standard electrode. These higher current densities can be tolerated since the fine metallic particles close to the arc absorb most of the additional energy.

Less distortion of the weldment can be expected with the new electrodes since the rate of travel is great enough to actually limit the heat input for a unit length of weld.

To insure adequate penetration, the base metal may be heated to prevent rapid chilling of the edges of the molten pool.

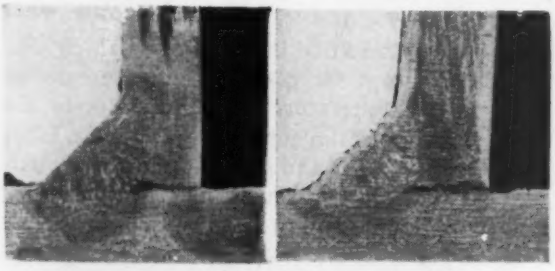
Where multiple pass welding is to be done, the thickness of each pass should be held to desirable limits. If the welding passes are more than $\frac{1}{8}$ in. thick, grain refinement by subsequent passes may be difficult to obtain.

The range of applications for the new electrodes is the same as for conventional electrodes with few exceptions. In most cases, either the drag of open arc technique may be used.

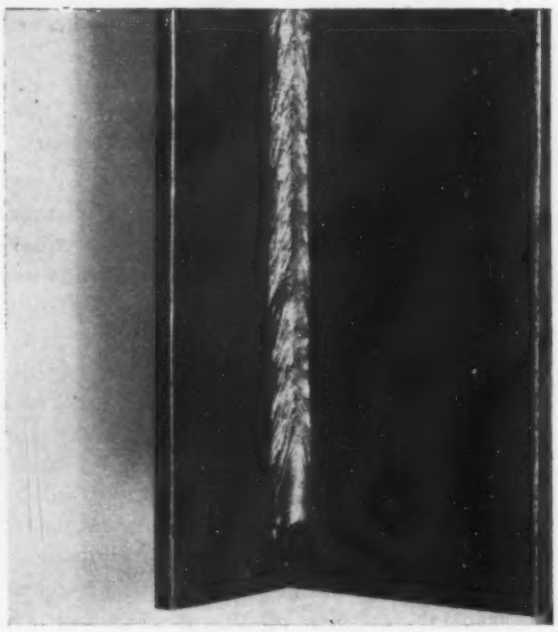
A typical application for the new electrode is that of joining two elliptical dished heads for circuit breaker oil tanks. Previously, these heads were assembled to the oil tanks and welded manually from the inside in preparation for automatic welding from the outside.

The inside weld had to be made in two passes with 3/16-in. electrodes. Also, it had to be oil tight and wide enough to properly back the automatic welding pass. The joint was prepared with small V grooves on both sides of the $\frac{1}{2}$-in. thick plate.

Using a $\frac{1}{4}$-in. Strikeasy I powdered metal electrode, a smooth, uniform weld of sufficient width was made along the inside seam in one pass. Moreover, the time required to make the weld was reduced by more than 60 pct. Overall welding costs were cut by nearly 50 pct.



FILLET WELDS made with conventional E-6020 (left) and powdered iron type E-6012 (right) electrodes have similar desirable contours.



CONTACT ELECTRODE produces smooth and uniform welds, free of notches, at high speeds. Overall welding costs are reduced.

Remove radiation hazard—

Compact Radiographic Inspection Setup Combines Safety With Good Handling

By J. A. Kearney Chief Metallurgist J. P. Brennan Metallurgist
Spaulding Works, Crucible Steel Co. of America, Harrison, N. J.

◆ Quality control in the production of a variety of castings at Crucible Steel Co.'s Spaulding Works is aided considerably by radiographic inspection techniques . . . Both x-ray and gamma-ray equipment are used . . . Facilities are housed in a compact area which permits a single floor area to be used night and day.

◆ Radiation sources are a 250 KVP x-ray machine and a 380 millicuries cobalt-60 isotope . . . These are placed one overhead and one underground in a 17 by 14 ft exposure room . . . The cobalt-60 capsule is brought into working position by a hydraulic linkage placed outside the room . . . This removes virtually all radiation hazard to personnel and permits greater utilization of floor space

◆ FITTING radiographic inspection facilities into a limited area has been successfully accomplished in the castings plant of the Crucible Steel Company of America. The variety of castings made requires procedures involving both X-ray and gamma-ray equipment.

Radiation sources are a 250 KVP X-RAY machine and a 380 millicurie cobalt-60 istope. These are placed one overhead and one underground, in an exposure room 17 x 14 ft, and are served by a dark room 13 ft by 9 ft.

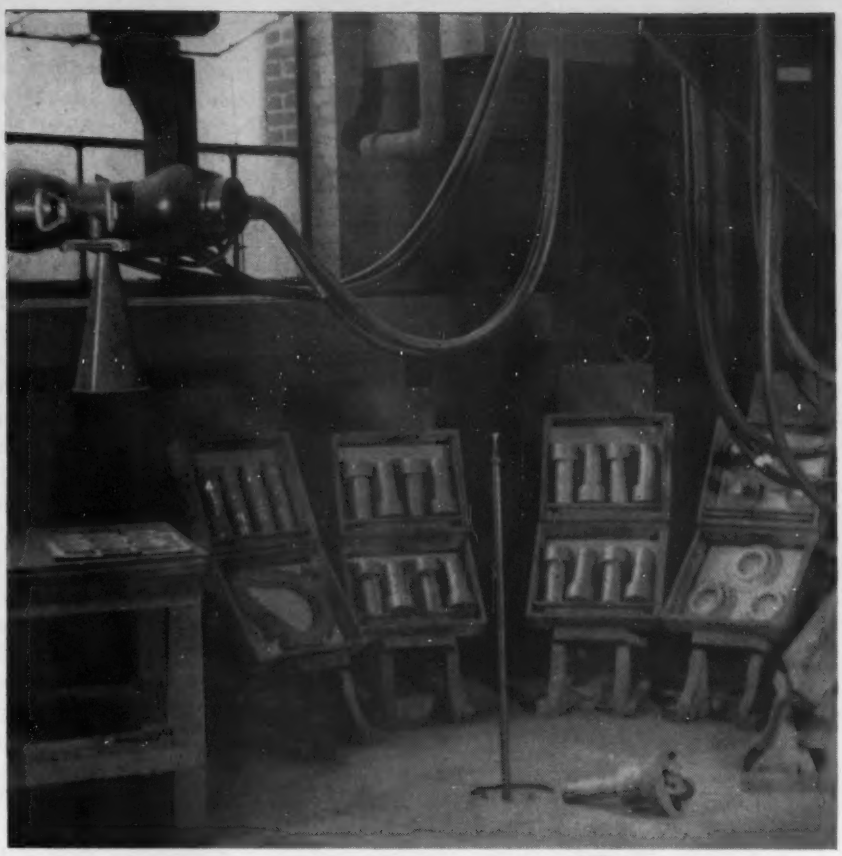
The cobalt source is of high specific activity, 1/16 in. diam by 1/16 in. long, in a capsule stored under the floor in a thick lead vault. It is brought into working position by a hydraulic linkage operated outside the room. This installation is believed novel. There is much advantage in removing virtually all radiation hazard to personnel, and a single floor area is made to work both night and day.

Essential features of the mechanisms are shown in the drawing on page 129. The cobalt-60 capsule is fixed on the top of the piston rod so that in storage it is in the base of the lead cylinder under a step-tapered lead plug. Prior to a gamma-ray exposure (normally for 16 hr overnight) the casting and film cassetes are set up in an array at appropriate distances around the pit. The operator then lifts out the plug and leaves the room. After locking the door, he pumps the piston to the top of its stroke, where it remains in hydraulic balance until the next morning. By reversing the procedure, the morning assistant withdraws the cobalt-60 into storage, seals the plug, then removes the exposed film to the dark-room for developing, and the exposure room itself is ready for daytime use in X-ray work.

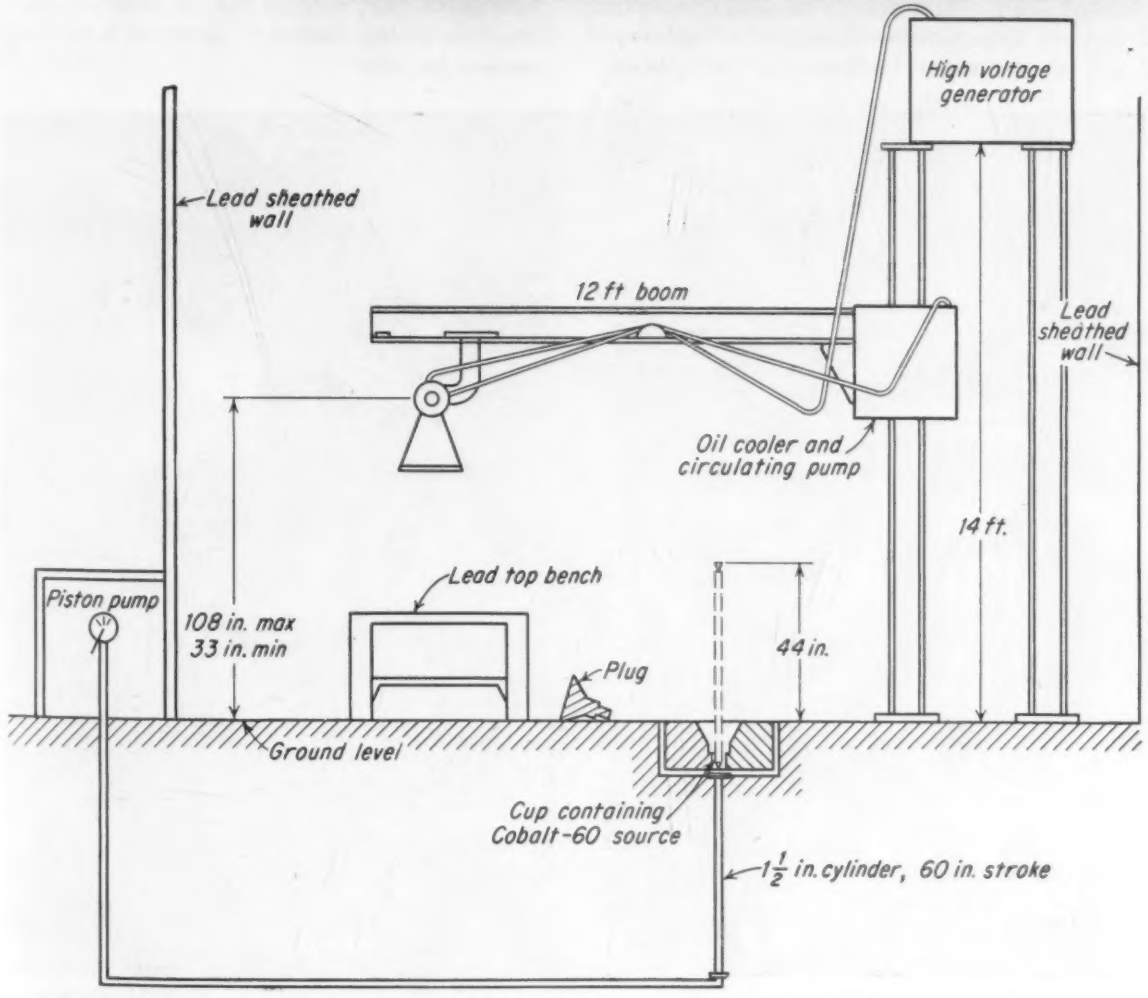
Avoid cable wear

The X-ray machine installation is fairly conventional except for placement of the external high-voltage generator. Since a steel plate was necessary to tie the job crane to the building structure, it was found possible to use the plate to support the transformer and rectifier, saving floor space and avoiding wear on the cables. The control panel is located outside the exposure room with electrical interlinkage to the door-switch for complete safety of personnel.

The exposure room is shielded on the inside walls with lead, and has an extended sill to pre-



COBALT-60 isotope, fixed on top of the piston rod, is in position for gamma radiography.



EXPOSURE room equipment, including 250 KVP x-ray machine, and retractable holder of radioactive cobalt-60. Hydraulic linkage outside room positions cobalt-60 capsule.

"Radiographic equipment is helpful in maintaining high quality . . ."

vent leakage under the door. A hollow-block wall, filled with zirconia sand absorbs radiation through the one outside wall.

The dark room is entered through a space-saving sliding-door and accordion door arrangement. Films are processed in a succession of three ten-gallon insert tanks in a master processing unit, with washing space for 27 films. The solutions are purchased in bulk as parts of a commercial tank service. Temperature control of the solution is achieved by a water temperature regulator incorporated in the processing unit, and by a room air conditioner. The air conditioner also safeguards unused film against deterioration.

A separate, smaller master tank gives additional washing space and also may function, in an emergency, as a processing unit. Three driers, each of 12-film capacity, are also in the dark room. The wall has fixtures for 100 additional film holders. The output from this equipment is about 80-100 films in an 8-hr shift with a two-man crew. Radiographic techniques are checked against film density readings taken on a process densitometer. Sensitivity limits are 2 pct of the metal thickness in radiography within the ranges of the gamma and the X-ray sources. The total range is from a fraction of an inch to six inches of steel.

"Readings" of radiographic film for final inspection, or for method study is delegated to metallurgists assigned to each lines of products. Illuminators for this purpose are located in separate areas of production and inspection.

In addition to the safety features built into the equipment, regular medical checks are made of the operators' physical condition and they are required to wear radiographic film badges which are measured weekly. Maximum exposure has been only 20 milliroentgens in a week compared with a tolerance level of 300 m.r. Surveys by instrument and by film have shown no harmful radiation in the working areas nor in the dark room.

This equipment has given excellent assistance in maintaining high quality standards. Sandcastings produced at Crucible are of low alloy steel, tank armor, stainless and tool steels ranging from one pound to five hundred pounds. Other sand-castings, conventional, or shell-molded, include superalloys and a large volume of Alnico magnets. Precision-investment castings are produced in high-strength alloy steels and in cobalt-base superalloys for high-temperature parts. Cast welding rod for hardfacing also requires quality control to maintain a minimum amount of porosity.

DARK ROOM and exposure room shown with high voltage generator at upper right. Warning sign shows "radium" rather than Cobalt-60 since it is better known as danger symbol.

Tool for management—

Standard Cost System Pinpoints Excessive Cost Areas, Lowers Operating Expense

By W. C. Fitts, Manager
Cost & Accounting Div., Anderson-Nichols & Co., Boston

◆ Replacing a job cost system with standard cost controls disclose new savings opportunities in diversified metalworking plants . . . The standard system will pinpoint responsibilities for excessive costs and show how much money is lost in below-capacity operations . . . And it gives management the tools to reduce costs.

◆ In just one year a standard cost system in a large drop forging plant has proven its worth to company officials . . . Important cost information is promptly and accurately reported for better production planning . . . Variances between "actual" and "estimated" costs are shrinking in all the major categories.

◆ A STANDARD COST SYSTEM, recently installed in a midwest drop forgihg plant in place of a job cost system, has been outstandingly successful. In a highly diversified production setup, the new method has made possible extremely accurate inventories, less overtime, lower clerical expense, and fewer idle equipment losses.

Job estimating has also become more realistic, resulting in fewer low margin or loss orders. Indirect labor has fluctuated with plant capacity to present additional savings opportunities. And with such standard cost advantages already proven, still greater savings are expected.

For a cost system to be most useful to management, it must: (1) pinpoint the responsibility for excessive costs, (2) show how much money is lost by operating below capacity, (3) give management the means to reduce costs.

A standard cost system will produce these three results, and more. But an actual, or job order cost system cannot be expected to shed too much light on these management objectives.

True, actual or job cost methods will detect profitable or unprofitable jobs as a guide for estimating similar work. They will also provide a basis for controlling operating efficiency and help on contract bidding where cost determines selling price. But these results will not clarify management's picture of excessive costs—where they are, how much they amount to and what is the best way to reduce or eliminate them.

In applying a standard cost system to the drop forging plant referred to, it was recognized that overall production was highly diversified. But it was already the firm's standard practice to estimate each order carefully to provide basic performance measurement data. And since departments, centers and account classifications were also established, the adoption of standard costs did not require any great deviation from existing cost accounting practices involving distribution.

To establish overhead rates at practical capacity, the analysts developed relationships between operating capacities and variable expenses, distributing both fixed and variable expenses to the cost centers. This followed general practice of using sold hammer hours, direct man hours or hundredweight as operating level indexes where they logically applied.

The system team selected an 18-month period for detailed analysis and, using scatter-charts, developed curves to show the relationship between operating capacities and maintenance and supply expenses.

As could be expected, the analysis of direct maintenance costs revealed excessive charges at times when production was either very low or

"Normal maintenance charges were increased to include infrequent overhauls in overhead rates . . ."

the equipment completely idle. This is not unusual, since many plants postpone major overhauls until vacation periods or long holiday week-ends.

Once the consultants established normal maintenance and its direct relation to productivity, they increased normal maintenance enough to absorb annual or semi-annual overhauls. This was done in order to include these unusual charges in overhead rates.

It can be argued that this method does not provide a true budget rate for the operating department. The theory is that it may show actual expenses less than the budget for eleven months, and in the twelfth month lose all that has been gained. But the real control of maintenance costs is in the budgeting of the maintenance dept.

The cost of utilities, steam, electricity, gas, water and air were determined in accordance with usage at the various capacity levels.

Indirect labor grouped

After the number of indirect workers required for each center or department was established, these personnel were separated into two groups: Those considered fixed or standby workers, and those directly variable with operating capacities. It was also necessary to know the number of direct workers. These studies permitted allocating the labor-related expenses: Social Security, unemployment insurance, hospitalization and vacation pay.

Fixed expenses of depreciation, insurance, taxes for equipment or replacement value, and land and building costs were distributed on the basis of floor space.

Identifiable direct costs were distributed to these direct control centers: Machine shop, steel handling, shearing, inspection, grinding and polishing, Magnaflux and Zyglo, cold sawing, Cutamatics, arc welding, butt welding, cold trim presses (by type groups), hot trim press, forging press, forming furnaces, rotary furnace, heat treat and pickling, Roto-blast and tumbling, forge shop and die shop.

The forge shop was further broken into hammer centers, including the hammer, the furnace and the press. The die shop was also divided by machine centers.

Indirect department or service centers comprised machine and equipment maintenance (not identifiable), land and building, die maintenance and storage, fuel oil storage, compressed air, product handling, steel handling, forge general, shipping, laboratory, factory general and factory office.

To incorporate service department costs in the direct center overhead rates, the analysis group adapted a basis for equitable and logical redistribution. Machine and equipment maintenance expenses were distributed on the basis of per cent direct maintenance costs in each center to total plant maintenance. Land and building was distributed on the basis of floor space. Product handling, steel handling and factory office were redistributed according to the number of people in each productive department or center.

It was felt that die maintenance and storage, fuel oil storage, compressed air, forge general, laboratory, and factory general could best be incorporated in final forging cost if they could be redistributed over the hammers. This presented a problem, because sold hammer hours, man hours or number of forgings had no bearing on these costs. They were fixed costs to a large degree, but could not be borne equally by the various hammer types.

Consequently hammers were factored on the basis of ram weights and striking force per square inch, together with replacement value and maintenance. Charting these elements in a curve gave relative factors which appeared equitable for service department absorption.

Die maintenance and storage was separated from die replacement. In addition to storage costs, die maintenance included minor dressing of dies before being placed on or taken off a rack for the next job; and taking dies out of the hammer for minor adjustments and returning them. Major repairs or resink were included in the die replacement factor.

Completion of these detailed studies permitted development of overhead cost rates by sold ham-

XXX CWT — INVENTORY CONTROL — TOTAL STD XOX — DIE NO. ABC

FORM 5442 — MONTH _____ — SALES ORDER NO. 1500-309 — FORM 5442-A 16000

	ENDING INVENTORY	COUNT STATION	BEGIN INVENTORY	PROCESSED PIECES	SCRAP HOT	SCRAP COLD	OPERATIONS NAME	OPERATIONS SEQ. NO.	STANDARD COSTS UNIT FORGING MATERIAL	LABOR	BURDEN	ACCUMULATED FORGING LABOR	BURDEN
	10000		5050	5350			MATERIAL		XX				

mer hours, man hours or hundredweight for each expense classification. This formed the basis for variable budgetary control.

Developed overhead rates

In conference with management, practical sold hammer hours were determined for the forge shop, and man hours or hundredweight for the other direct centers. Allowances were made for holiday, vacation and normal downtime. Once practical capacity indexes were decided, it was possible to arrive at overhead rates for standard cost purposes. These independently developed rates were not too far from average published industry rates.

In some industries standard material costs need reviewing only once or twice a year. Because of rapid metal price fluctuations it was obvious that realistic drop forging standards could not be set for any lengthy period. It was decided to use the per pound price in the original estimate of each order. Quantity standards for material came from the methods department's standard practice sheet.

Despite wide experience, the original ideas for establishing direct labor standards in the plant received a serious jolt. It was thought that once standard rates and standard times were established, simple daily and weekly comparisons between "actual" and "standard" would develop direct labor variances.

The cost team depended upon reasonably accurate production reporting on daily time cards, or equally accurate chronolog reports. When attempts were made to reconcile production reported on time cards with actual known production, the discrepancies were fantastic. But a solution was available.

During development and installation of the cost program, a production control system was also set up. It incorporated the "counting station" principle used in other drop forge plants. These "counting stations" appeared to be the answer to the direct labor measurement problem since they gave an accurate production count.

All that remained was to devise a means for reporting to the cost department the number of pieces of each die number processed during the period. The procedure developed did measure direct labor accurately and also provided: (1) the standard cost of hot and cold scrap, (2) the standard cost of forgings in process, and (3) finished forgings by die number and sales order number. As reported on an inventory control sheet for each die number and scheduled run, the procedure also checked on undisclosed or unknown scrap losses.

Picks up excess labor

The aforementioned system determined the causes of unknown labor variances. Payroll analysis picked up excess labor which could be identified as overtime premium, idle time or extra operations. For example, a second setup is considered excess labor if only one setup is originally scheduled.

This application of standard costs did not abandon all job cost elements, inasmuch as the inventory control sheet records standard costs for each scheduled run. Original actual cost information as reported on shear sheets, scrap reports and time cards is also retained for any order or die number.

Factory order processing starts in the cost department with copy receipts of the sales order and the notification of order schedule. These are held pending receipt of the standard practice sheet from the methods department and the shear sheet from the production department.

With this information, plus reference tables for standard hourly rates and standard burden rates, cost clerks compute the standard piece cost sheet. This establishes the yardstick for measuring factory performance on the order.

Notifications of the unit standard cost are also prepared from this standard piece cost sheet. These advise the accounting department for costing sales, the sales department for profit margin and the inventory control section for maintaining in-process inventories.

Because the inventory control sheet is so important to the standard cost system, a detailed description of the procedures involved may be of interest.

Two-part inventory control

The inventory control sheet, is in two parts: (1) The large spread sheet whose column headings are shown on p. —, and which is used for entering units and cost extensions, and (2) a fly sheet for the unit standard piece costs.

DIE NO. ABC
SALES ORDER NO. 1500 - 309
RUN 16000
GROUP A

S. P. 99.99

PROCESSED				DEPT.	INVENTORY				HOT SCRAP			COLD SCRAP		
MATERIAL	LABOR	BURDEN	TOTAL	NO.	MATERIAL	LABOR	BURDEN	TOTAL	M	L	B	M	L	B
XX			XX		XX			XX						

"Production control system's 'counting stations' were the answer to direct labor measurement . . ."

After notification of a scheduled order, an inventory control sheet is developed by entering the following information: Die number, sales order and factory order run, also standard cost of material per hundredweight, selling price, code classification and calendar month.

Reference to the illustrated inventory control sheet headings will assist in following the procedures. To demonstrate full use of the form, consider an order started previous to the current month.

Enter month-end figures

Prior to the current month's end, the previous month's inventories for the same die and order number are transferred to the new inventory control sheet. The sheet is then sent to the production department, which enters the current month-end inventories at the respective control stations. They also enter the number of forgings shipped at the bottom of the "Processed Pieces" column, and in the "Hot and Cold Scrap" column the units scrapped at each operation. The sheet is then returned to the cost department.

The cost department first verifies the pieces shipped with the billing department. Next they determine the number of pieces processed. This is done by adding to the shipments or last operation, the reported scrap and ending inventory minus the opening inventory. This procedure also reveals any undisclosed scrap.

The fly sheet containing unit standard costs and cumulative standard costs is then attached for comptometer extension of pieces processed, ending inventory, and scrap.

In order to prove the above extensions without verification, the opening inventory dollar amount is listed on the bottom of the control sheet at the left. The comptometer operator also computes standard cost of sales by multiplying total standard unit cost by units sold. The opening dollar inventory, plus material, labor and burden processed, less scrap, and the cost of sales, equals the amount of the closing inventory on the control sheet.

The inventory control sheets are then sorted by product class and summarized to provide: (1) standard cost of material consumed; (2) standard cost of direct labor applied; (3) standard cost of overhead applied; (4) standard cost of hot and cold scrap; (5) standard cost of the in-process inventory; (6) standard cost of die replacement.

This information provides the journal entries for the factory ledger and the basis for determining variances between standard and actual.

The important features of the standard cost system have been covered, but these alone do not make it a useful management tool. It is the byproduct reports of these procedures that are important to operating executives.

Two reports of budgeted expenses are prepared. The first is by center or department, showing hours sold, actual expenses, budgeted expenses and variance for the month and year to date. The second is a report of each department's expenses broken down by expense classification and grouped as controllable, semi-controllable, services, and fixed. This report also shows current month and year to date comparisons of actual versus budget.

Another report for management, and particularly the sales executives, shows the cost, by hammers and other cost centers, of operating at less than practical capacity. This involves multiplying the fixed part of the overhead rate by the difference between practical sold hours and actual sold hours.

The factory manager also receives a report, showing the variance between standard direct labor and actual direct labor for each department; also the variance between standard burden and actual overhead expenses.

A standard cost system should also enable management to anticipate possible trouble spots, and to forecast operating profits and losses.

For such forecasting, the drop forging plant uses a "Monthly Forecast of Production" schedule form with the following headings: (1) die number, (2) order number, (3) number of pieces, (4) setup cost, (5) die replacement, (6) direct labor, (7) direct material, (8) direct burden, (9) total cost, (10) sales margin.

This report immediately reveals jobs that show a loss or low margin. Management can take steps to study the operations before processing begins, and revise methods to cut costs.

From this production schedule, departmental cost information is listed on a separate forecast form so that personnel changes can be made to balance with required capacity.

A third monthly forecast sheet is made for the forge shop. Column headings list, for each hammer, the cost of material, direct labor, burden, die material, die burden, setup labor, setup burden, total cost and selling price. Here again management has prompt and complete planning information before starting a new month.

These forecasts must go to management on or before the first day of the month to be of value. To meet this target date without excessive clerical cost, the firm uses punched cards processed by a local service bureau. Once standard costs for each die are known, a stack of prepunched cards gives basic data for collating another card set for the monthly schedules.

This installation has been in operation a little over a year. There is every indication that it is more than fulfilling its original objectives.

Uses increase—

DUCTILE IRON
Meets Heavy Duty Service Requirements

By D. M. Marsh
Foundry Engineer
The Cooper-Bessemer Corp.
Mount Vernon, Ohio

♦ Growing production experience with ductile iron has brought improved process control and widened its range of physical properties . . . The material's unusual combination of desirable qualities have led to many new uses.

♦ Excellent castability, high tensile strength, and high notched fatigue endurance are factors favoring its application to heavy duty machinery . . . Autoclaves, horizontal engine cylinder heads, heavy crankshafts, diesel engine center frames, all items subject to unusual service loads, have been produced successfully from ductile iron.

♦ DUCTILE IRON'S range of physical properties has been broadened and made more predictable as the result of a four-year research program at the Mount Vernon, Ohio, and Grove City, Pa., plants of The Cooper-Bessemer Corp. The production of this relatively new engineering material is a complex and exacting process requiring close control. Now, as a result of continued study and production experience, many of the earlier problems have been resolved.

Experience at these plants is based on 1800 heats, for which more than 200 patterns have been used to produce castings from 1 to 25,000 lb. Section thicknesses of 1 and 3 in. have been successfully cast in the same piece.

Data on 21 recent consecutive heats at the Mount Vernon plant are shown in Fig 1. Data for 100 consecutive heats at the Grove City plant are shown in Table I. Results are for 3-in. Y blocks run through the heat-treating cycle with the castings.

Much of Cooper-Bessemer's production of Ductile iron castings is in heavy section thicknesses. The 3-in. Y block is preferred to the 1-in.

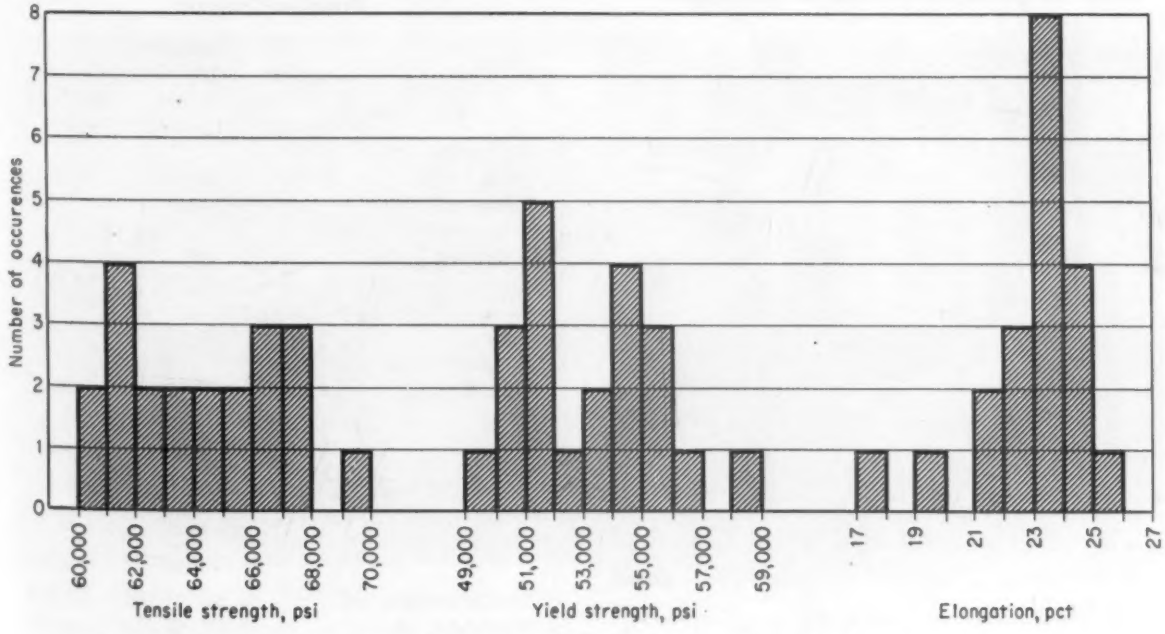


FIG. 1—Occurrence of physical properties in 21 consecutive foundry heats of ductile iron.

"Test results showed that ductile iron could be safely used in compressor applications for discharge pressures up to 1500 psi . . ."

keel block normally used for control purposes. This size specimen was chosen after correlating test results with bars taken from critical sections of many castings.

Effect of section size on test results from the as-cast material is shown in Table II. The crankshaft to which the data pertains has a diameter of 8 in. in the journal sections and 7½ in. in the crankpins, which makes the section thicknesses considerably greater than that of the 3-in. Y block. Since data from the Y block could be misleading, an extension 8-in. long and the diameter of the journal is cast on the end of each crankshaft. A test bar is taken from near the cope surface of this extension. This section is

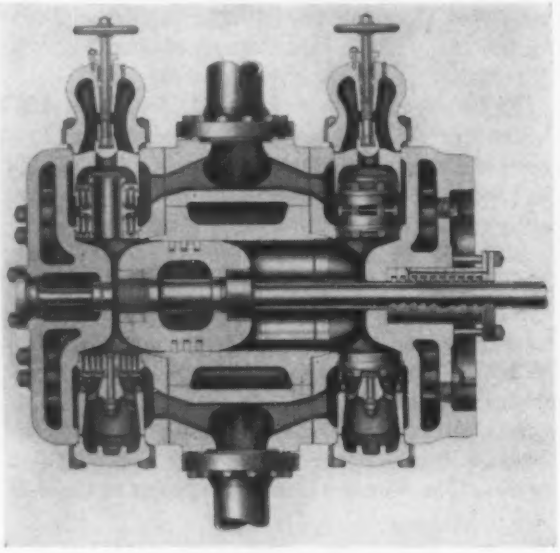


FIG. 2—Compressor cylinder of ductile iron operates at pressures to 1400 psi discharge.

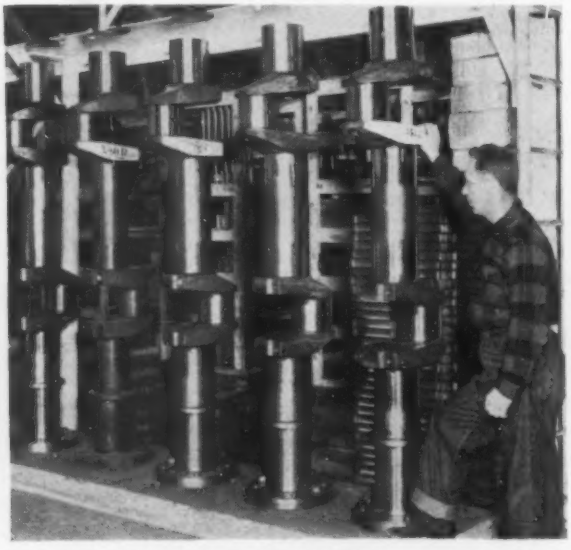


FIG. 3—Ductile iron crankshaft for a 4-cylinder, V-type gas engine. Weight: 1720 lb.

TABLE I

PHYSICAL PROPERTIES

Tensile Strength, psi	59,000–65,500
Yield Strength, psi	42,750–50,250
Elongation, pct	17.6–26.6

Taken from 3-in. Y blocks fully annealed with castings. One hundred consecutive heats.

TABLE II

EFFECT OF SECTION SIZE

Ductile iron crankshafts

	Tensile Strength, psi	Elongation, pct
3-in. Y Block	92,000–108,000	3.6– 5.7
Coupon Cast on Crankshaft	80,000– 84,000	3.3–10.2

as-cast, stress relief heat treatment only*

TABLE III

DUCTILE IRON VS. FORGED STEEL

	Ductile Iron* Crankshaft	Forged Steel Crankshaft
Tensile Strength, psi	79,200	80,100
Endurance Limit, smooth bar, psi	31,500	35,000
Endurance Limit, notched bar, psi	20,750	17,800
Modulus of Elasticity, millions	22.6	29
Brinell Hardness	220	170

*Ductile iron stress relieved.

TABLE IV

PRESSURE VESSEL MATERIALS

Properties Compared

	Gray Iron ASTM A48 Class 60	Ductile Iron ASTM A339 Grade 60-45-10	Cast Steel ASTM A27 Class 65-30
Tensile Strength, psi	67,750	61,750	71,750
Endurance Limit-Smooth Bar Rotating Beam, psi	24,500	21,750	26,000
Bursting Pressure, psi	8,250	14,750	16,200
Pressure Fatigue Limit, psi	2,350	3,100	3,350

TABLE V

FULLY ANNEALED DUCTILE IRON

600 gal autoclave.

	Y Block	Casting
Tensile Strength, psi	64,500–69,700	61,600
Yield Point, psi	49,000–54,700	49,900
Elongation in 2 in., pct	19.5–23.4	7.1

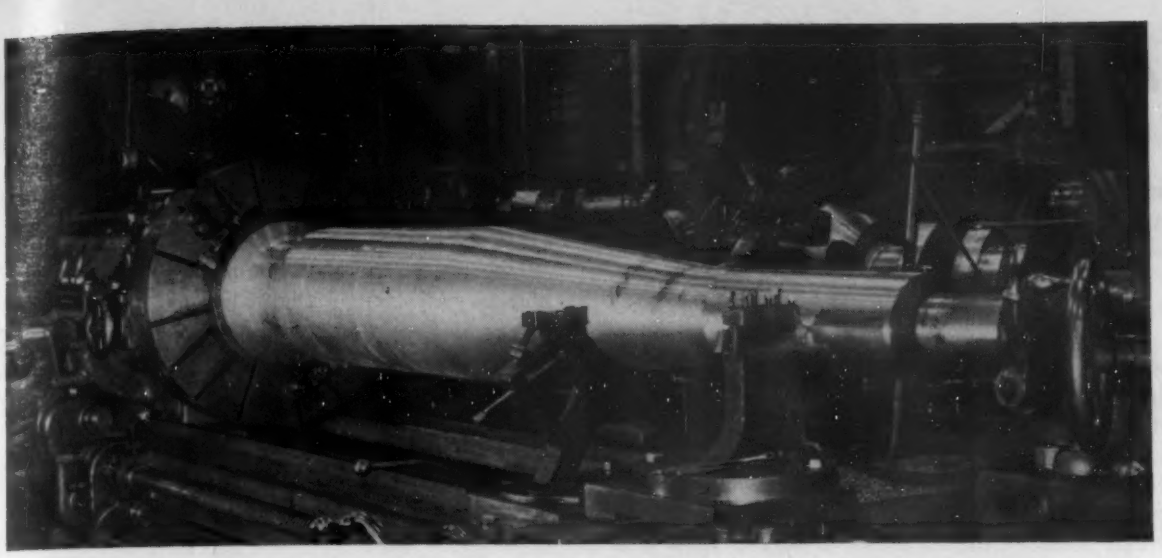


FIG. 4—Generator shaft of ductile iron transmits 3300 hp from diesel engine to generator.

cut off after the crankshaft is stress relieved.

Each case of exceptional casting thickness is treated in a similar manner so that the test piece will give an indication of the true physical properties of the material in the casting.

For four years a company research program has explored potential uses for ductile iron, process improvements, and methods of reducing costs. An experimental department, equipped with a 42-in. lined diameter cupola has been in operation for two years at Mount Vernon. The research program has been carried on by company engineers with assistance from The International Nickel Co. Experience indicates ductile iron possesses qualities in a special combination making it worthy of consideration for an increasing number of applications.

Reciprocating compressors designed to operate in excess of 1000 psi discharge pressure constitute one of the most valuable applications to date. Cast steel purchased to ASTM Spec. A-27 Grade 65-30 had been used for the main stress parts of these compressors. Because of intricate design, difficulty was experienced in obtaining satisfactory steel castings.

Ductile iron's excellent castability together with strength comparable to cast steel indicated it was suitable for this application. To determine its adaptability to this type of service, special pressure tests have been run. These tests, Table IV, compared several materials available for this type work.

Based on these results it was determined ductile iron could be used safely in compressor applications for discharge pressures up to 1500 psi.

Since the findings on pressure vessels were made, 96 ductile iron compressor cylinders of the type shown in Fig. 2 have been installed and are operating at discharge pressures to 1400 psi.

Fig. 3 shows crankshafts cast of ductile iron. These receive only a stress relief heat treat-

FIG. 5—Design of horizontal engine cylinder head calls for intricate coring and variable section thicknesses. Before ductile iron was used casting of sound heads was difficult.

ment. Bearing surfaces retain their hardness and impart excellent wearing qualities to the shafts. High tensile strength and high notched fatigue endurance of this material suit it well to this application.

Exploratory work on high notched fatigue endurance found that an 0.050 in. radius notch in a 1-in. diam test bar gave similar notched endurance limits for forged steel, cast steel, acicular iron, and ductile iron. Also, the stress concentration factor of 1.30 for ductile iron, compared favorably with that of 1.26 for the cast steel. This factor is 1.96 for forged steel and 1.53 for acicular iron.

Physical properties for a ductile iron shaft are shown in Table III. Tensile strength and elongation in the crankshaft and in 3-in. Y blocks for a number of these crankshafts are shown in Table II.

Other economies have contributed to the development of ductile iron shafts as compared to forged steel shafts. Considerable machining is eliminated by using the ductile iron shaft because it can be cast to shape. Also, the machinability of the as-cast ductile iron is comparable to gray iron in the 45,000 psi range.

The ductile iron extension shaft, Fig. 4, is designed to transmit 3300 hp at 327 rpm from a diesel engine to a generator. This shaft, 10 ft 5 in. long, has a maximum diameter of 20 in. and a minimum diameter of 10 in. It was previously made of forged steel, but changed to ductile iron when it was found this material satisfied the high service requirements for modulus of elasticity and fatigue endurance. About 300 of these shafts are in use, 68 over three years.

The horizontal engine cylinder heads, Fig. 5, were originally cast in a class 40 gray iron. A number of the pieces cracked in service radially around the flared opening, Fig. 6, which is subjected to high surface temperatures and may have cracked due to severe thermal conditions.

FIG. 6—Radial cracking around this flared opening was overcome with use of ductile iron.

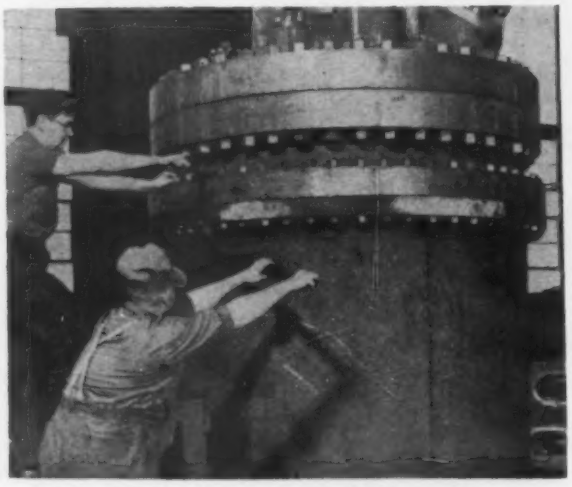


FIG. 7—Six-hundred gal autoclave, used to process chemicals is cast from ductile iron.

Meets Navy Specs

An attempt was made to eliminate the cracking by changing to ASTM Spec. A-27 class 65-30 cast steel. The design calls for rather intricate coring and variable section thicknesses and difficulty was experienced in casting sound heads. The heads were cast in ductile iron, and this material has been used successfully for four years.

An autoclave used in the chemical industry is shown in Fig. 7. Except for the bolts, nuts, and fabricated steel jacket, all parts of this autoclave were cast of ASTM A339-51T Grade 60-45-10 ductile iron, replacing ASTM A 27 Class 65-35.

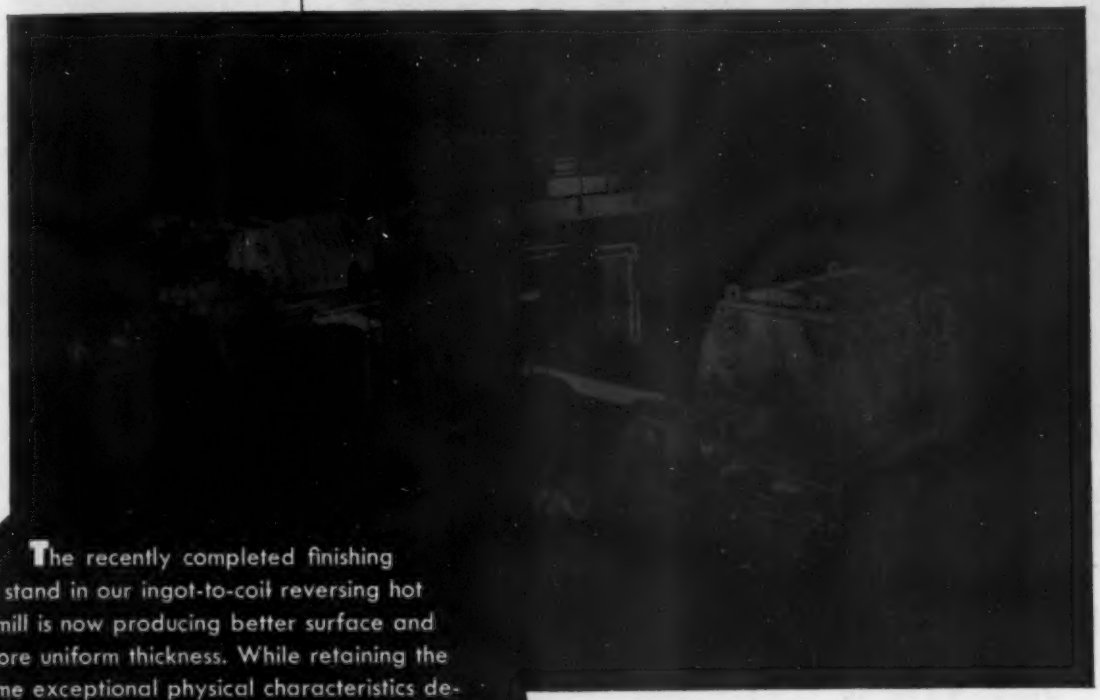
The pressure vessel is designed to operate at 350 psi and 300° F. In Table V a test bar taken through the riser at a point 8 in. above the finished top flange is compared with a bar taken from the standard Y block. The riser was 9½ in. thick at that point. Comparison of Tables II and V show a closer correlation between the 3 in. Y block and the fully annealed material in heavy sections than between the 3 in. Y block and the as-cast material in heavy sections.

This marks the first time ductile iron has been used for this application. It was found to have good resistance to the abrasive and corrosion conditions.

Permission to use ductile iron in an unfired pressure vessel at the temperature and pressure named above was granted by The Industrial Commission of Ohio, Boiler Deputies, under "Ohio Special" Specification No. 258, Aug. 18, 1953.

Following tests by the U. S. Navy ductile iron has also been approved for service in diesel engine center frames aboard U. S. Navy ships.

New REVERSING HOT MILL AT *Newport Steel*



The recently completed finishing stand in our ingot-to-coil reversing hot mill is now producing better surface and more uniform thickness. While retaining the same exceptional physical characteristics developed by this type of rolling, an extra measure of quality is added to hot-rolled and hot-rolled pickled coils and sheets. Next spring brings another important advance as an entirely new cold mill operation gives the booming Midwest and South a nearby source for cold-rolled sheets. Let us explain how you can profit by these notable advantages at Newport Steel.

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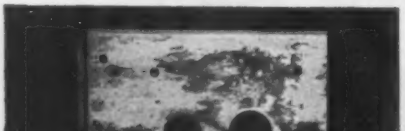
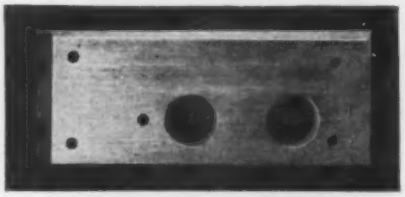
How Diebold, Inc. keeps their SAFES SAFE from rust



This part from a Diebold safe door was covered with fingerprint neutralizer, then spotted with synthetic perspiration. In a matter of days destructive rust was apparent.



This Diebold safe door part was spotted with synthetic perspiration, covered with fingerprint neutralizer, then wrapped with Marvellum VPI. At the end of the test there was no indication of rust. The part was in the same excellent condition as the day it was made.

with MARVELLUM vpi WRAP

No wonder, after the tests shown above, Diebold Inc. chose Marvellum VPI® Wrap to protect their safes from rust. All ferrous metal parts are now kept wrapped from the moment they are made and each safe . . . large or small . . . is protected by Marvellum VPI before and during shipment. A special coating on the VPI paper vaporizes . . . forms an invisible protective film that positively prevents rust.

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New Technical Literature:

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Polishing lathe

Folder illustrates and describes the installation of a polishing lathe and abrasive belt backstands. Mounting structure is attached to the base of the polishing lathe to which the backstands are mounted. Backstands can be either spring or air-tensioned models. Installation is recommended for plants where abrasive belts can be used to advantage, but limited space makes it impractical to install the backstands in back of the polishing lathe. *Hammond Machinery Builders, Inc.*

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Blast cleaning

Bulletin describes table-type airless blasting machine called a 72-in. Wheelabrator Swing Table, distinct from other swing-table-types airless blasting machines in that it requires no pit for the abrasive hopper. Bulletin shows how loading and unloading of machine can be done rapidly by means of auxiliary tables. Also explained are the special vestibules that are available in the walls of the machine to accommodate occasional long pieces. Electrical and mechanical specifications and views showing over-all dimensions are included. *American Wheelabrator & Equipment Corp.*

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Steelox

Steelox (interlocking steel paneled) building is the subject of brochure. Buildings of 40 ft are now available in heights up to 20 ft. Units can be placed side by side, making the total floor area to be enclosed. Additional features are lean-to's and open sidewalls. *Armco Drainage & Metal Products, Inc.*

For free copy circle No. 3 on postcard, p. 145.

Stackbin system

Folder describes the Stackbin system of storage and materials handling. Shows graphically how the system is used throughout industry to cut handling costs, save space, improve inventory control, minimize loss and damage. Gives specifications and prices on stackbins, stackracks and sectional stackbins. *Stackbin Corp.*

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Temperature control

Booklet on precise control of air temperature and moisture discusses applications of air conditioner and its capabilities. The sizes of units are manufactured, ranging in air capacity from 1000 to 24,000 cu ft per min. *Niagara Blower Co.*

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Carbon-steel electrodes

Booklet is a study of the properties of electrode weld deposits for production use in the welding of carbon steel by the inert-gas-shielded metal-arc process. Pictures of weld specimens and numerous charts are included. *Air Reduction Sales Co.*

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Flame-plating

Flame-plating is a process for depositing thin coatings of tungsten carbide on the surfaces of parts and many tools where extra resistance to wear is required. Booklet lists advantages, properties and the latest specifications of the flame-plated tungsten carbide coating. Booklet also contains pictures and descriptions of new applications. Special sections have been devoted to an explanation of what areas can be coated and to the economics of flame-plating. *Linde Air Products Co.*

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Catalogs & Bulletins

Industrial pumps

Catalog describes industrial pumps made by the Deming Co. Contents include information on construction features, performance and selection tables for the pumps and information related to liquid materials handling problems. *The Deming Co.*

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Stress rupture values

Data card presents stress rupture data on 11 tubing steels used in high temperature service. Included among these steels are carbon steel, intermediate chrome - molybdenum steels and stainless steels. Data developed by stress rupture tests offer important means of evaluating the characteristics of metal for operation under stress and high temperatures. *Babcock & Wilcox.*

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Ductile iron

Bulletin shows the machinability characteristics of various grades of ductile iron which possess the process advantages of cast iron and has engineering properties that approach those of cast steel. A survey of possible applications is given. It indicates a wide range of fields in which ductile iron may economically replace other materials. *International Nickel Co., Inc.*

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Electric platform truck

Bulletin pictures and gives dimensions and specifications on Yale 4000 and 6000 lb capacity worksaver low lift electric platform trucks. Features of the truck depicted are dead man control which automatically cuts off power and applies brake when operating handle is either in the full up or full low position. High maneuverability made possible by 16-in. diameter turntable and tapered roller bearing support as well as direct gear drive. *Yale & Towne Mfg. Co.*

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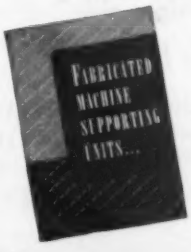

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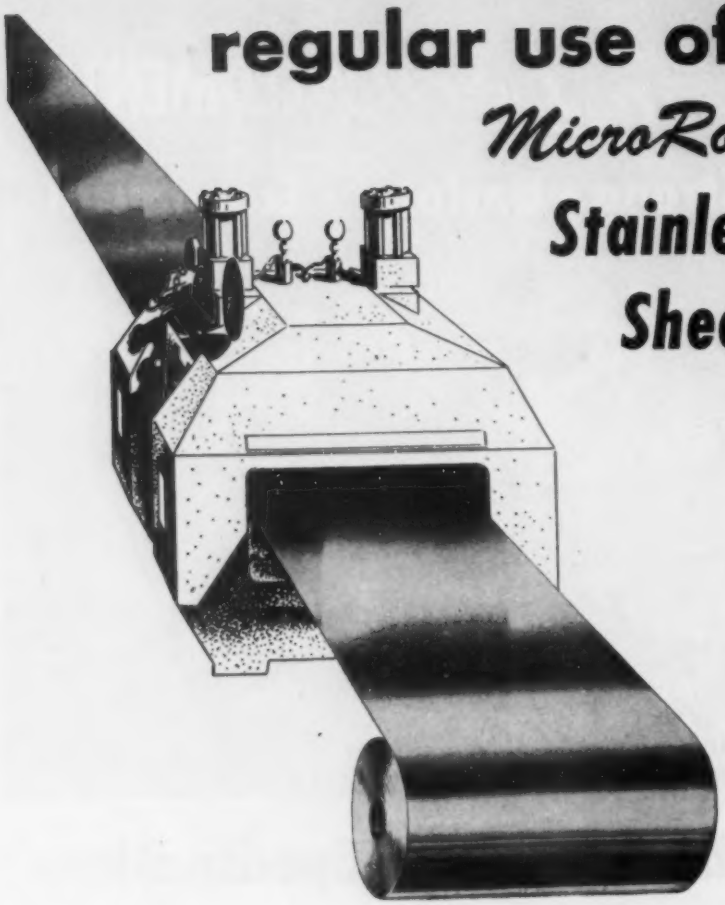

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FREE TECHNICAL LITERATURE

Capacitrols

Bulletin on Wheelco "400" series capacitrols includes discussions on the measuring system, Wheelco "Electronic Link," between measuring and control system, construction and assembly. Specifications are given on indicator, control units and dimensions and weights and scale ranges are also included. *Barber-Colman Co.*

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Celite

Brochure covers the general advantages of Celite diatomite products, then gives detailed information on the use of Celite in nine basic types of finishes with one or more typical formulations for each. Brochure also contains information on Celite as a filter aid for clarification filtration in producing varnishes and lacquers. *Johns-Manville.*

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Threading machines

Bulletin covers the 32C and 40C Landmaco threading machines. Machines illustrated are designed for heavy duty threading of large diameter workpieces. Specifications are included. *Landis Machine Co.*

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Diesel engines

Technical bulletin discusses Diesel principles and design, types of engines in use, operating cycles, engine accessories and the choice of the correct Diesel lubricants. A quick-reference trouble-shooting chart lists remedies for faulty performance. *Sun Oil Co., Ltd.*

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Resistance welding

"Resistance Welding at Work" covers case history of Sciaky electric resistance welding equipment as used at the Moloney Electric Co., manufacturers of transformers. Covered is an example of the three-phase electric resistance welding of spot, seam and projection welding of distribution transformer tanks to rigid specifications. Bulletin is illustrated. *Sciaky Bros., Inc.*

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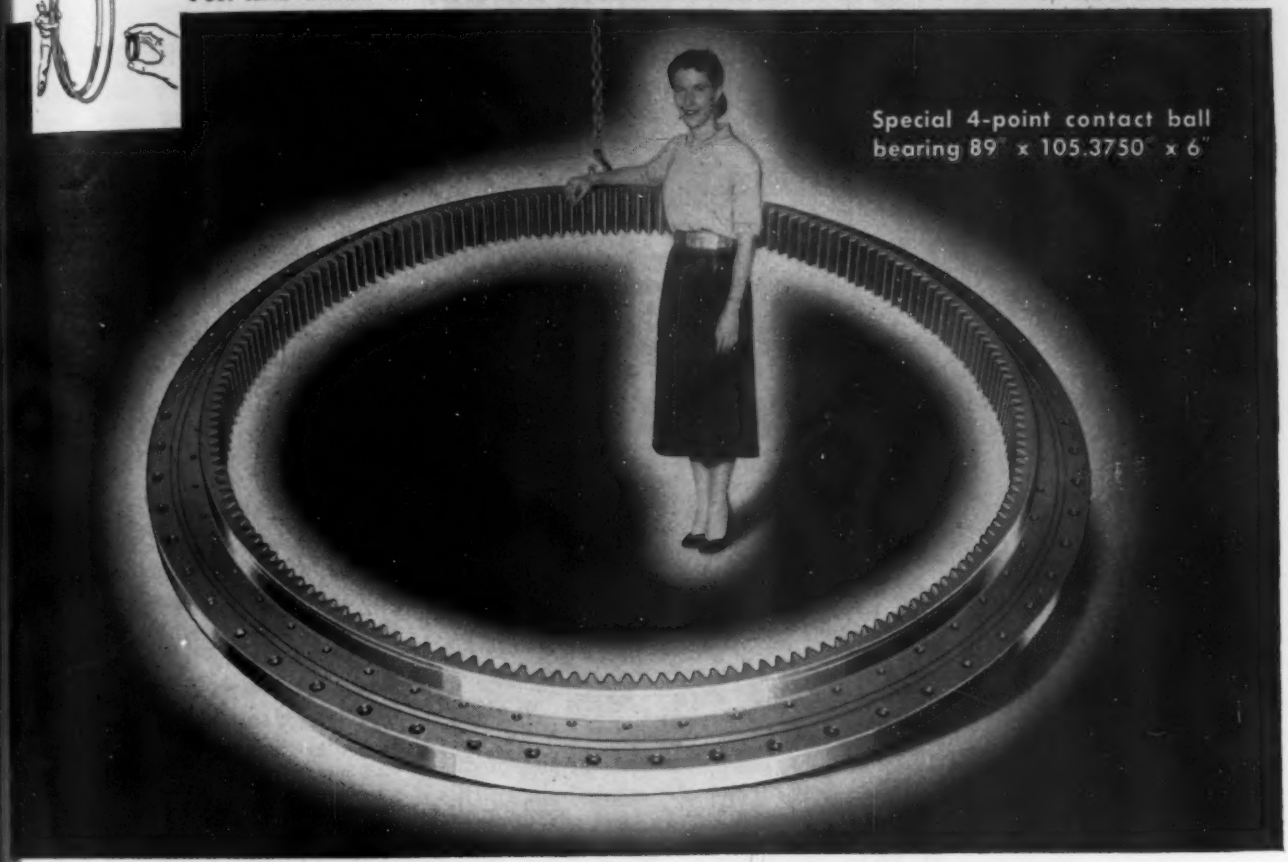

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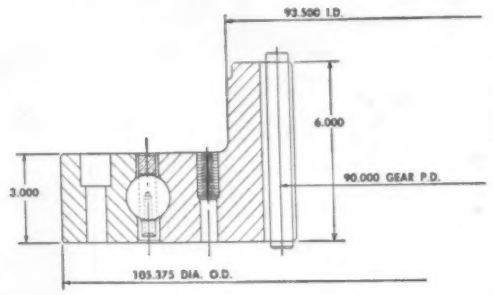

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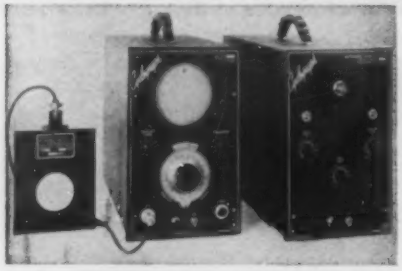

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Instruments:

Interference microscope measures small peaks and valleys.

A new type of microscope that measures peaks and valleys ranging from 2 to 100 millionths of an inch has been put to use by General Motors Research Laboratories. Known as the interference microscope, it shows promise not only as a research tool but as a quality control instrument where microscopic smoothness or roughness is highly important.

Physicists working with it claim it adds the dimension of depth to the practice of examining microscopic surfaces.

The optical interference principle by which the microscope operates is not new. However, industrial application of the microscope to surface finish details of such minuteness is a new development. The GM instrument is one of the first three instruments built on this continent.

Glass Block Splits Beam

The interference or split beam principle is described as follows: A beam of light is directed into a block of glass or "beam splitter." The light is split into two parts, with one part directed through a lens to a flat reflecting surface.

Measures in millionths . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 145. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

The other part of the beam is directed downward through another lens where it is reflected from the surface of a specimen under examination.

After being reflected from the flat reflecting surface and from the specimen surface, the two beams return through their respective lenses to the beam splitter where they recombine to form an interference pattern. The pattern appears as a series of lines—even and parallel if the surface is smooth, or zebra-like, wavy and jagged if the surface is uneven.

Safety:

Helium gas assembly eliminates explosion hazard.

An installation that eliminates the hydrogen-air explosion hazard in heat treating and brazing operations was recently devised at the National Bureau of Standards.

Use of hydrogen gas in heat-treating and brazing presents an explosion hazard, especially if the gas is piped from a remote reservoir to the various operating stations. One general practice is to allow hydrogen to flow into an enclosure (such as a bell jar) and escape into the room. Safe operation depends on the hydrogen being above atmospheric pressure and maintaining a continuous outward flow.

Broad Danger Range

If the hydrogen pressure is allowed to fall below that of the atmosphere, air and hydrogen will mix. When about 7 to 73 pct of hydrogen is in the mixture an explosion can occur if the tempera-

ture range is approximately 500° to 600° C.

There are differential pressure controls and relay devices which automatically indicate a pressure change, but these will not prevent an explosion.

System Adapts Readily

The new system uses helium gas to purge and flood hydrogen lines automatically thus preventing the admission of outside air if internal hydrogen pressure falls below atmospheric pressure. The assembly is adaptable to almost any type of hydrogen gas supply.

In the installation, a cylinder of helium is connected in the hydrogen network. The pressure regulator in the helium line is normally set from 10 to 20 lb lower than that of the hydrogen line. The helium begins to flow only if the hydrogen-line pressure drops to the preset helium pressure. Hydrogen remaining in the system is then rapidly expelled until fully replaced by helium.

Tooling:

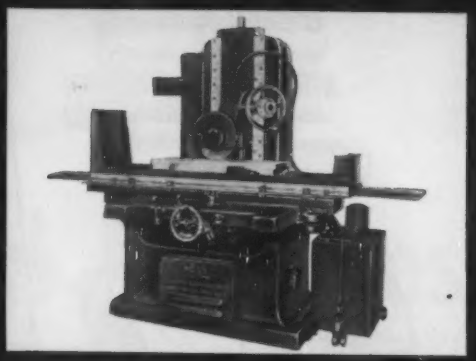
Resilient resin speeds tool production, cuts cost.

A new, resilient plastic is helping the aircraft industry reduce costs in airframe construction. Tools and dies are being made of this material in 60 pct of the time it used to take, and they are produced to closer tolerances at one-half the cost.

The new material is based on Shell Chemical Corp's Epon resin and was formulated by Kish Resin, Inc., Lansing, Mich. Using this new material for only 4 months on a special die design, Lockheed Aircraft Corp. is now producing 15 intricate stainless steel and aluminum alloy airframe parts.

The male part of the die is surfaced with the resilient material and a hard surface Epon resin is used for facing the female section. This method permits a precision die surface to be cast from a model without machining or hand finishing. No allowance needs to be made for the thickness of sheet metal to be formed. Also, lead punches and flexible plastic materials with less

When the need is for SPEED —and PRECISION



You need a
GRAND RAPIDS GRINDER

Here is extra value, extra accuracy, extra high-speed performance. Every Grand Rapids Hydraulic Feed Surface Grinder has a one-piece column and base for vibrationless rigidity and permanent alignment between cross travel ways and upright headways. Both longitudinal table travel and cross feed are hydraulically operated. On the larger machines, the wheel head is powered for rapid vertical travel. ***The model 55 has longitudinal table speed of 125 fpm.!***

All parts are machined to micrometric tolerances and precision assembled for perfect freedom of action and entire elimination of play. That's why 6 out of 10 of these machines are sold to firms already using Gallmeyer and Livingston grinding machinery.

• **SEND FOR FULL FACTS TODAY!**
We'll answer within 24 hours

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400 Straight Ave., Grand Rapids, Mich.
Please send me the following literature without obligation:

☐ Grand Rapids Surface Grinder Catalog
☐ Grand Rapids Universal Cutter and Tool Grinder Catalog

NAME
POSITION
FIRM
FIRM ADDRESS

dimensional stability have been replaced.

Benefits resulting from this new method are:

Tool cost reduced to 50 pct of previous cost.

Production lost time for replacement reduced 65 pct.

Stainless steel and aluminum airframe components, comparable in quality to those made on high cost double action presses, are turned out by inexpensive drop hammers.

Eliminates 5000 man-hours a month in construction and maintenance of lead punches.

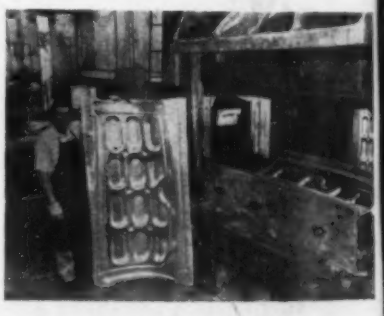
Reduces wrinkles in airframe parts.

Reduces costly "speed hammering" to take out wrinkles and surface imperfections.

Dies are durable and have greater accuracy. Zinc alloy die backing is reclaimable.

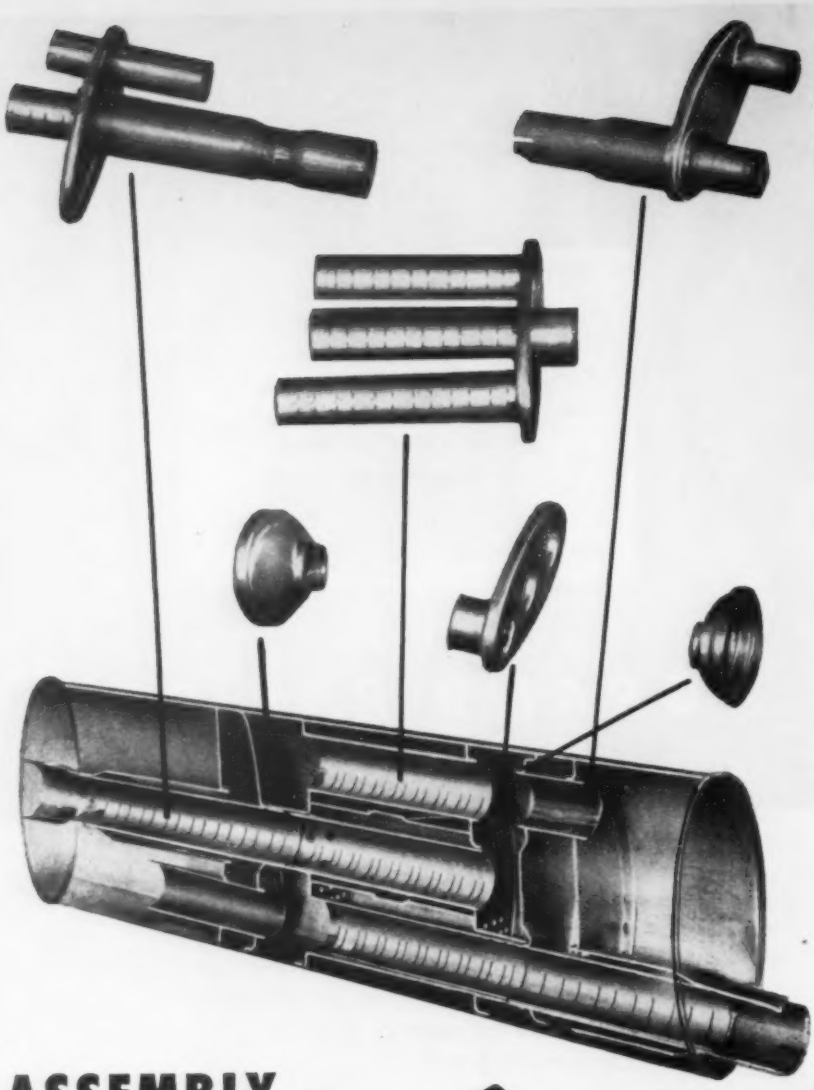
Useful in Automotive Industry

The importance of this development is the lower tooling cost and lower capital investment in production machinery. The new material, while exhibiting the required resilience, retains the basic qualities of low shrinkage, toughness, dimensional stability, good adhesion to metals or plastics, and excellent resistance to chemicals.



Wrinkle-free parts . . .

Resist hammer blows . . .



ASSEMBLY-- WELDING TIME 6 SECONDS!

Six individual baffle assemblies are inserted into muffler shell, accurately positioned and securely welded. Total elapsed time for completed job is an amazing six seconds.

In this short interval 96 spot welds are made — 16 welds each to the six baffle assemblies.

This Federal welder replaced several individual spot welders, eliminated a great amount of handling and boosted production by some 200 per cent.

It's the type of thing Federal engineers have been doing consistently for some of America's leading fabricators. Why not talk over your welding operation with a Federal man. There's no obligation and chances are he can show you how to reduce your production costs. It's the big reason why **Federal stays — "First in Resistance Welding."**

Federal WELDERS ®
Warco PRESSES ®

THE FEDERAL MACHINE and WELDER COMPANY
WARREN, OHIO

HERE'S PROOF: You can always count on Continental for every fastener need!

Continental Produces Over 1,756,000 Styles and Sizes of Standard Screws Alone!

. . . to quickly meet your every demand

Whether your needs are special or regular fasteners, always count on Continental for satisfaction. Their total of over 1,756,000 different sizes and types of standard screws alone give you a greater selection than any other fastener producer.

You can be sure that their design engineers and production specialists will give you the benefit of their experience with every standard or special fastener.

Profit from this experience. Put them to work for you today. Call direct or through your local distributor. Continental has proven for 50 years that it can better satisfy your every need.

Manufacturers of HOLTITE Fastenings

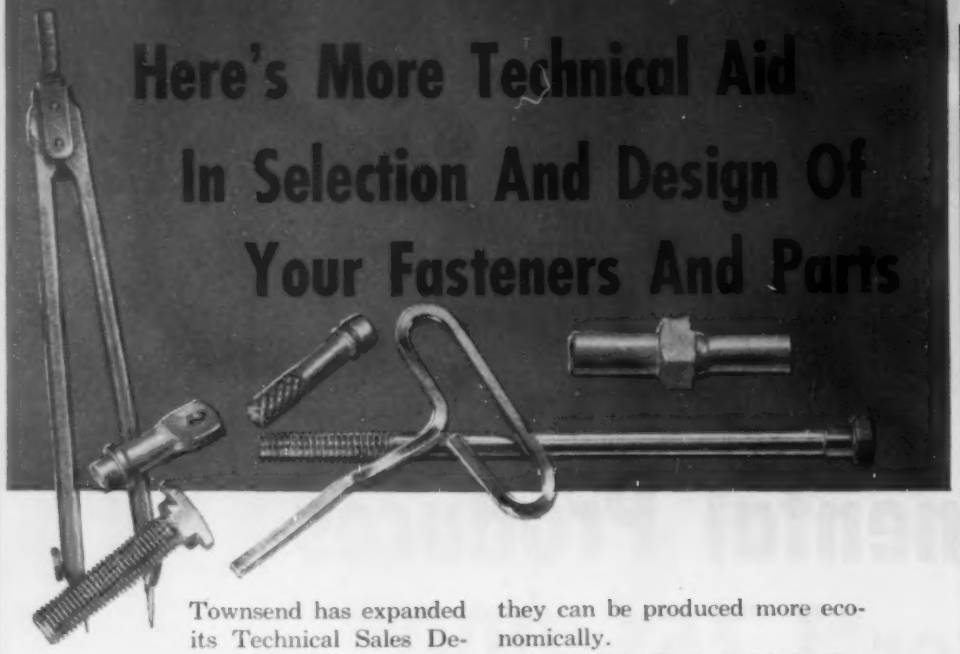
CONTINENTAL SCREW COMPANY — INC. ★ 1904

50th Anniversary

CONTINENTAL SCREW COMPANY

New Bedford, Mass., U. S. A.

Here's More Technical Aid In Selection And Design Of Your Fasteners And Parts



Townsend has expanded its Technical Sales Department to help you in your constant effort to improve your product, reduce unit costs and speed assembly. Here, a group of specialists works as a unit to devise the most economical and efficient methods of product assembly for all industry.

These men can serve you in several ways. They will visit your plant as fastening consultants to your design engineers and operating men. They will analyze a particular product and design special parts for it or suggest use of standard products in the assembly.

You may want them to study your entire production line for improved assembly techniques—they will even design a single part to solve a specific problem.

Another way to obtain the services of this department is to send drawings and samples of specific items for suggestions as to how they can be produced more economically.

Back of the Technical Sales Department is a company with nearly a century and a half of wire drawing and cold-forming experience. More than 10,000 standard and special parts and fasteners are produced regularly by Townsend.

In addition to the wide range of products and design experience at your command, Townsend has the tremendous capacity to produce 60-million pieces a day. This means you can depend upon Townsend to keep pace with your production lines since, in its several plants, there are enough machines of any type to handle a variety of long production runs simultaneously.

To learn how you may effect substantial savings in material costs, speed production and improve your product, write today for illustrated bulletin or use the coupon below.

THE FASTENING AUTHORITY

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COMPANY • ESTABLISHED 1816

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Sales Offices in Principal Cities

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In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send Technical Sales Department Bulletin TL-98.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

Ultrasonics:

Cleaning unit lowers rejects on shaver parts.

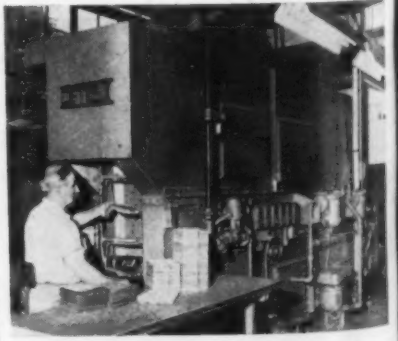
A fully-conveyorized ultrasonic metal-cleaning machine now operating at the Stamford, Conn. plant of Schick, Inc., has reduced labor costs over 25 pct and lowered rejects in the cleaning of finely-machined shaver parts. Hand brushing prior to inspection has been completely eliminated.

The most important benefit derived from the ultrasonic cleaning equipment is the increased quality possible due to extreme cleanliness. Ultrasonic cleaning, performed by a Detrex Soniclean machine manufactured by the Detrex Corp. of Detroit, also reduces poor work in other subsequent operations, and makes inspection easier and more thorough.

Convert Electrical Energy

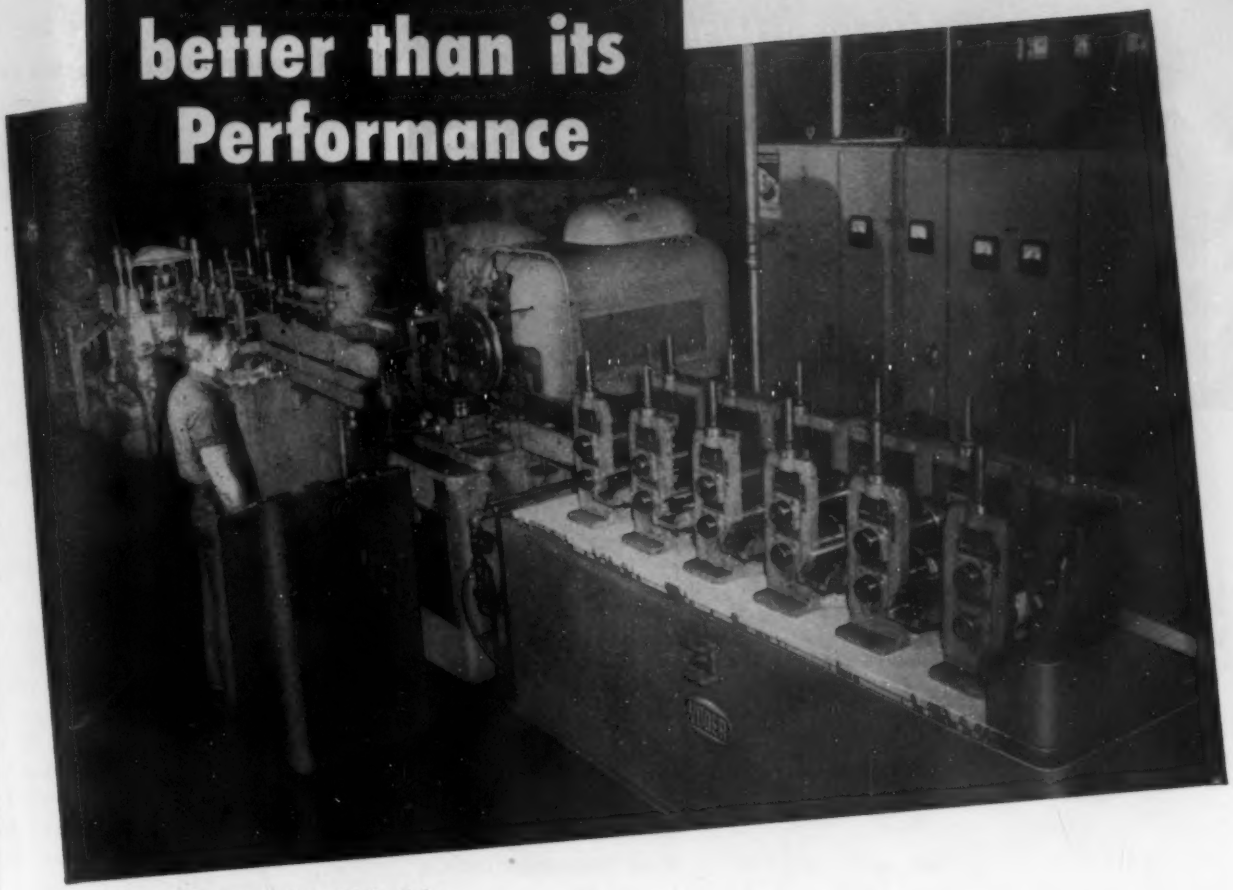
In the Soniclean process, electrical energy is converted into high-frequency sound waves which "scrub" the parts to a degree of cleanliness never before achieved on a production basis. Using a trough-type barium titanate transducer directly immersed in a degreasing solvent, particle acceleration of 1,500,000 times the force of gravity is achieved in the focal region.

The process can be applied to nonabsorbent materials such as metals, glassware, and molded products in removing difficult soils to a degree previously not obtainable. It can also replace many hand brushing or wiping operations to remove soils from cavities, indentations and small holes.



Ultrasonic cleaning . . .

No Tube Mill is better than its Performance



Above: One out of three Yoder Tube Mills at Standard Steel Spring Co., Trenton, N. J. and Los Angeles, Cal.

Performance means production of good tubing, with minimum scrap losses, not only per hour or per day, but year in and year out. On this basis Yoder mills are most profitable in the long run.

Yoder mills have always been noted for their consistently high output, high weld strength and low scrap losses. Today, with the new Yoder 4-in-1 Cross-type Welding Transformer and other new features, their performance is more outstanding than ever.

And because most prospective buyers carefully investigate and compare performance records, there are more Yoder mills sold and in use than of all other electric resistance weld mills combined.

The Yoder Tube Mill Book tells the story of electric-weld tube making and answers many questions of interest to prospective tube mill owners. It's yours for the asking.

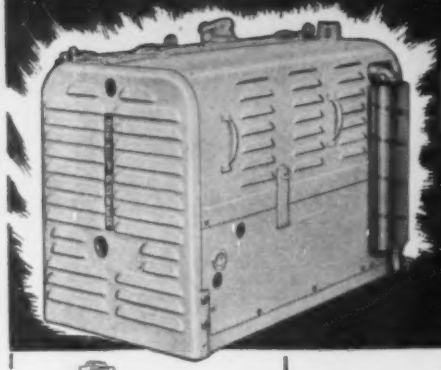
THE YODER COMPANY • 5510 Walworth Avenue, Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING

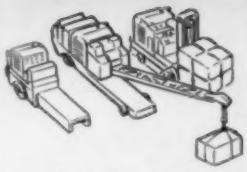
The Most Flexible "Power Package" available for Industrial Trucks!



READY-POWER
Gas-Electric Drive

Ready-Power units can be installed in minutes

You can remove Ready-Power units in minutes



Use Ready-Power on any type of electric truck

Ready-Power units can be interchanged with batteries

"Tune up" a spare Ready-Power while trucks work

Ready-Power-equipped trucks know no time limitations

There are Ready-Power models for all truck sizes

Ready-Power is the originator of gas-electric drive for electric industrial trucks!

Get the Ready-Power Story!
Write for Bulletin 99
IF YOU DESIRE DETAILED SPECIFICATIONS STATE YOUR TRUCK SIZES

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Fuel:

LP gas provides safe, low cost operation for in-plant trucks.

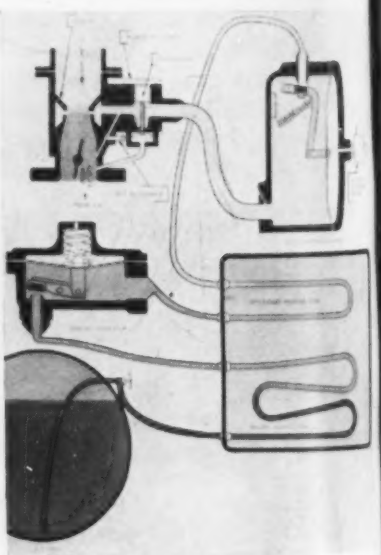
Less oil consumption, less maintenance, and cleaner working conditions are advantages claimed for shop trucks that have been converted to LP gas fuel. Unlike gasoline, LP gas enters the combustion chamber completely vaporized. The American Liquid Gas Corp., Los Angeles, points out there is no dilution of oil or carbon buildup to cause frequent repair or servicing stops.

The LP liquid gas is usually drawn from the tank by a converter, which the fuel vaporizes before it enters the engine.

This vapor form is reported to leave no carbon, lead or varnish deposits to cause sticky valves and sludge in the motor. This is an advantage to fork-lift operation as the trucks are generally slow moving, with long idling periods to promote sludge and carbon in the crankcase. Oil consumption is said to be much less because crankcase oil never becomes dirty and diluted, oil keeps its viscosity longer, and less make-up is needed between changes.

Triples Engine Life

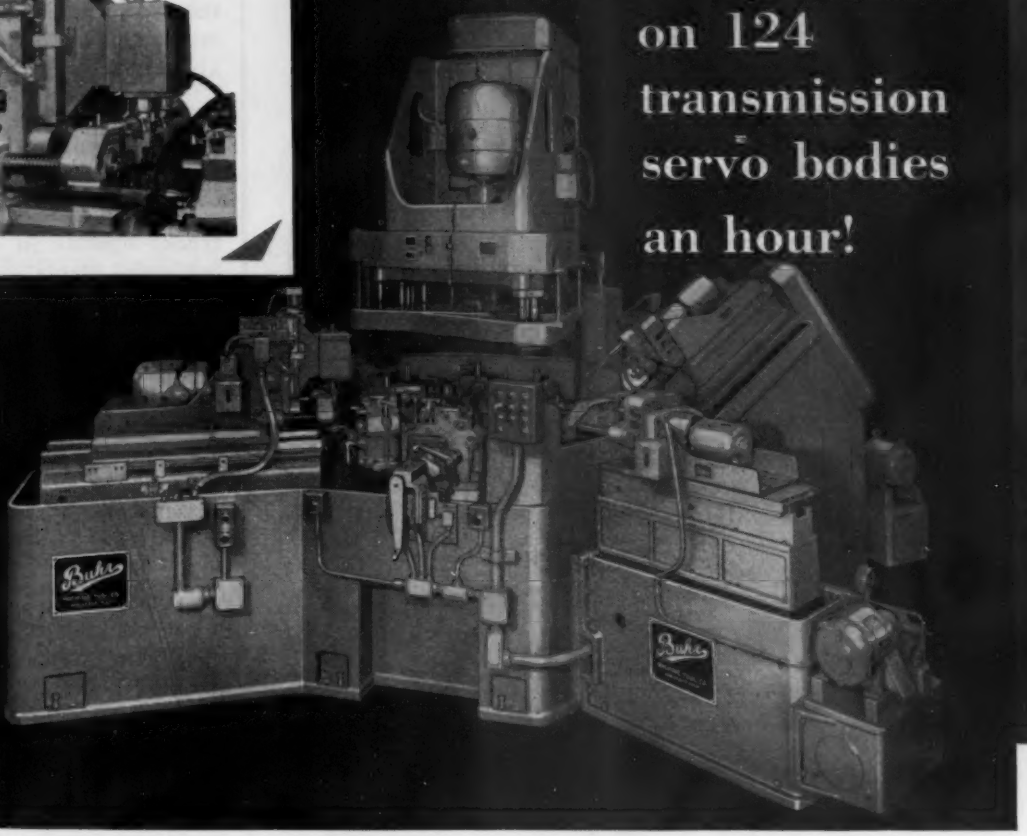
Many case histories show that valves which ordinarily had to be ground every 1500 to 2000 hours



LP conversion setup . . .

Buhr SPECIAL...

Performs 18 operations on 124 transmission servo bodies an hour!

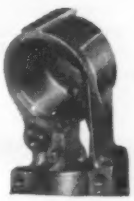


This 5-way automatic-indexing dial-type Buhr Special has a 6-station, 2-position fixture which features relocating the part in each fixture.

Especially noteworthy is the *special milling head* arranged with automatic back-up so that cutters do not disturb the close micro-finish on their return stroke. (See inset blowup above.)

A tool board is used to keep tool-changing time to minimum.

Multiple heads are of Buhr ball-bearing construction with shaved gears and broached-and-splined drives — a Standard Feature on all Buhr Specials.



Available at your request — our 48-page Catalog or a consultation with one of our sales executives.

BUHR MACHINE TOOL COMPANY
252 GREEN STREET, ANN ARBOR, MICHIGAN

MULTIPLE-SPINDLE HIGH PRODUCTION MACHINERY

Solidly Engineered . . . Precision Built . . . for World's Leading Manufacturers

Information Here

"HOW TO LOWER YOUR COSTS" can have as many answers as there are departments and employees in your plant. A good first move is to ***know*** the equipment available which could raise manufacturing efficiency, cut unit production costs and work for greater employee contentment.

EVERY PLANT EXECUTIVE should have this complete informative CM Catalog at his fingertips. Your copy sent on request.

CM
OVERHEAD
MATERIALS HANDLING EQUIPMENT
HOISTS • TROLLEYS
TRAVELING CRANES

CM METEOR
½ to 5 ton capacities. Fast, low headroom heavy duty wire rope electric hoist. Single and two speed models. Many exclusive features.

CM COMET
⅛ to 2 ton capacities. Portable, compact and rugged electric chain hoist. Available in push button and pendant rope control models. Plug in on 110, 220 or 440 volt power lines.

CM CYCLONE
¼ to 10 ton capacities. Lightest weight and most efficient chain hoist. Rugged aluminum alloy construction for heavy duty and long life.

CM PULLER
¾, 1½, 3 and 6 ton capacities. Lifts and pulls at any angle. For 1,001 jobs. Low-cost. Safe and easy to operate.

CM TROLLEYS
Low headroom. Tandem, Matchless and Moore styles. Plain, geared or motor driven.

CM
HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

Fork lift truck engines easily converted for use of LP gas at low cost . . .

when using other fuels, now last twice as long. Overall engine life is doubled and sometimes tripled. Oil changes formerly made once every week are now made no oftener than once a month.

With less cylinder wear and general overall engine strain, overhaul requirements are reduced to a minimum and general maintenance costs are said to be cut as much as 50 pct.

No Objectionable Odors

Because LP-Gas is clean burning, it produces no obnoxious gases. This is an advantage where *fork-lift* trucks operate in closely confined industrial plants.

Conversion to LP gas is relatively simple and can be done by any automobile mechanic. It consists of changing the conventional gasoline carburetor to an LP carburetor, or a spud-in kit may be used with the gasoline carburetor. In either case a converter and filter are necessary to complete the system.

Has Underwriters' Approval

Although most fork-lift conversions are made for liquid withdrawal of LP gas from the tank, equipment is available for vapor withdrawal systems.

The complete conversion, including fuel tank installation, can be made in a few hours. Total cost is said to be nominal.

Use of LP gas has full approval of the Board of Fire Underwriters, providing proper fittings are used and normal handling precautions are followed.

Use Spare Tanks

Plants which do not use LP gas for other purposes, and do not maintain bulk storage, are solving their fuel problem with extra removable tanks which can be quickly changed. Many plants which maintain their own storage also use these removable tanks for ease of filling and operation.

Lockheed Aircraft Corp. is converting their fleet of approximately

130 material handling units to LP gas operation in their Burbank, Calif. plant. American Liquid Gas Corp. is working with several other firms on conversion of their fork-lift equipment. ALGAS products are being used by many manufacturers of material handling trucks.

Plating:

Brush plating saves time in plating equipment in service.

A brush plating method marketed for sometime as a retouch and repair method is now finding increased use in original plating.

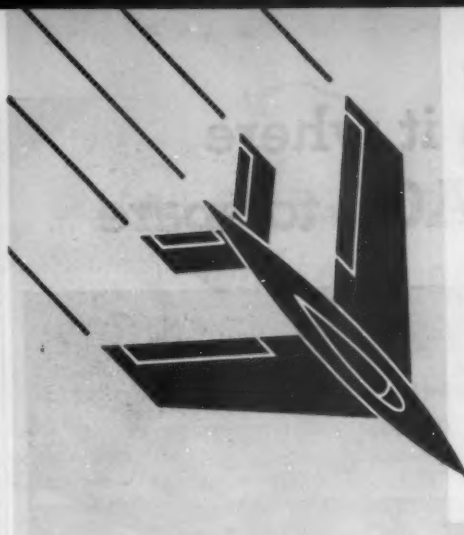
Manufacturers of the equipment, Ajax-Consolidated Co., Chicago, report that electrical contractors are using this method to meet specifications on new installations and to rehabilitate old electrical equipment without dismantling.

According to an American Silver-Producers' Research report, brush plating will give thinner non-porous coatings than have yet been obtained by standard plating procedure, and the bond of brush deposited metal is superior to any known process. It is claimed that movement of the brush or applicator during plating produces a burnishing action, resulting in a dense uniform deposit.

Withstands High Temp.

The company also claims that brush plated parts can be heated to 1500° F and quenched in cold water or oil without damage to the bond or deposits. Complete industrial equipment is available for plating brass, bronze, cadmium, cyanide copper, sulphate copper, gold (24 Carat), lead, nickel (plus cobalt), nickel (black), silver, tin and zinc. Three ac power units are made: 110-120 v, 50-60 cycle; 110-120 v, 25 cycle; 220 v, 25 or 60 cycle.

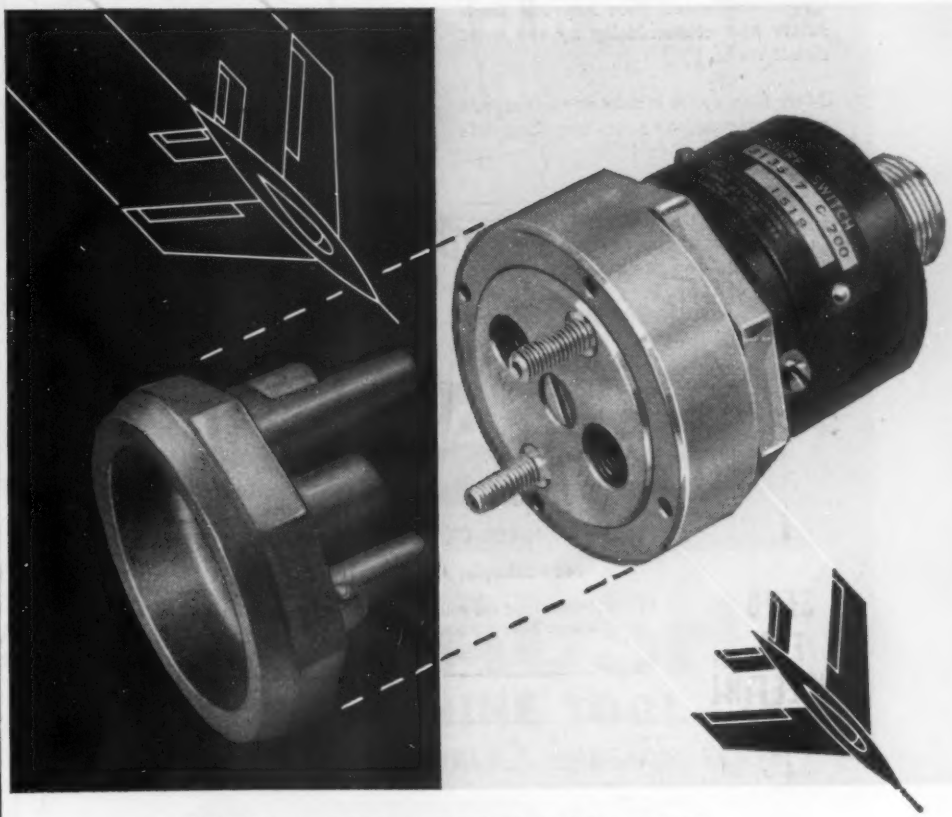
A deposit of pure silver for a bus contact of approximately 16 sq in. can be applied in 50 to 60 seconds. One gallon of silver plating solution will cover 30 sq ft of area to 0.00025 in. thickness, it is reported.



MUELLER BRASS CO. forgings help insure dependable operation of aircraft pressure warning instruments

A specially designed housing, accurately forged to customer specifications by Mueller Brass Co., seals in the diaphragm of the pressure warning unit manufactured by Eclipse-Pioneer Division of Bendix Aviation Corporation in Teterboro, New Jersey. The unit, designed for installation in fuel, oil, water or alcohol lines of modern aircraft is a highly sensitive instrument that instantly warns the pilot or flight engineer of any unusually high or low fluid pressures.

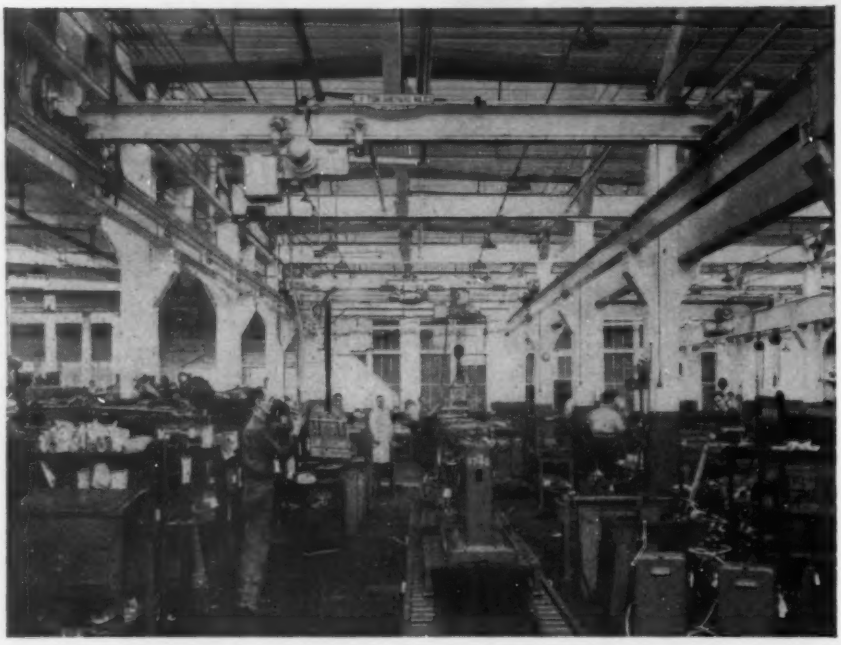
All Mueller Brass Co. forgings have a dense, close-grained structure with a high tensile strength. Weight savings up to 40% are possible in the design of parts because of the close tolerances to which they can be produced. Less scrap and longer tool life result from the easy machinability of forged parts. Mueller Brass Co. is completely equipped to design parts for your products, specify alloys (including special alloys developed by our metallurgists), forge, machine, finish and plate the parts and perform all necessary assembly operations. Write today for our free illustrated 32-page forgings catalog and complete information about MBCo forged parts for your products.



MUELLER BRASS CO.

PORT HURON 24, MICHIGAN

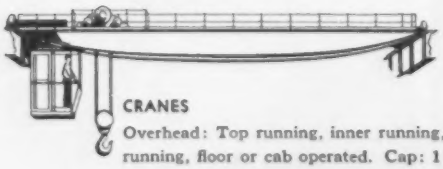
Handle it where there's SPACE to spare



SHEPARD NILES Crane

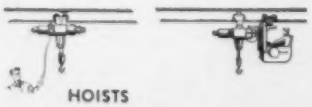
Want more room for production or storage? Then move your handling overhead! Install a Shepard Niles Crane and speed your heaviest loads safely and economically by the most direct route.

More floor space is only one advantage which through-the-air handling affords! Let a Shepard Niles representative explain the many other benefits it offers. He'll recommend a crane that is specifically engineered to your plant's needs. And remember: all component parts are designed and built by Shepard Niles especially for crane operation—your guarantee of long, dependable service with a minimum of maintenance.



CRANES

Overhead: Top running, inner running, under running, floor or cab operated. Cap: 1 to 450 tons.



HOISTS

Operated from cab, floor or pulpit. Cap: 1 to 20 tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION

SEND FOR BULLETIN!

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1439 Schuyler Ave., Montour Falls, N.Y.

( ) Please send me your latest Crane Bulletin.
( ) Please have a representative call.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

Rolling:

Compact, combination mill switches from 2 to 4-high quickly.

For space and cost economy, a new heavy duty combination rolling mill can be quickly converted from a 2-high to a 4-high configuration. A single compact unit, the mill is reported capable of hot flat rolling, cold flat breakdown, 2-high or 4-high cold flat finishing, and hot or cold rolling of wires and shapes.

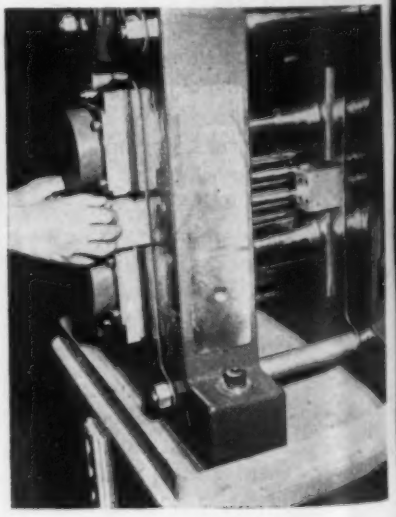
Motor Drive Enclosed

Developed by Stanat Mfg. Co., Long Island City, N. Y., the mill can be used for bar, rod and strip reduction, and is said to be advantageous for firms seeking a single multi-purpose unit. Motor and drive are completely enclosed in the base of the mill, contributing to its compactness.

Gets More Reduction

Many 2-high strip mill users are familiar with the inability of a completely screwed-down mill to produce further gage reductions. One solution has been to continue processing the strip on a four-high or cluster mill having considerably smaller work rolls backed up by large supporting rolls. The new combination mill was developed particularly to overcome this operating problem.

To change from 2-high to



Switch to a 2-high . . .

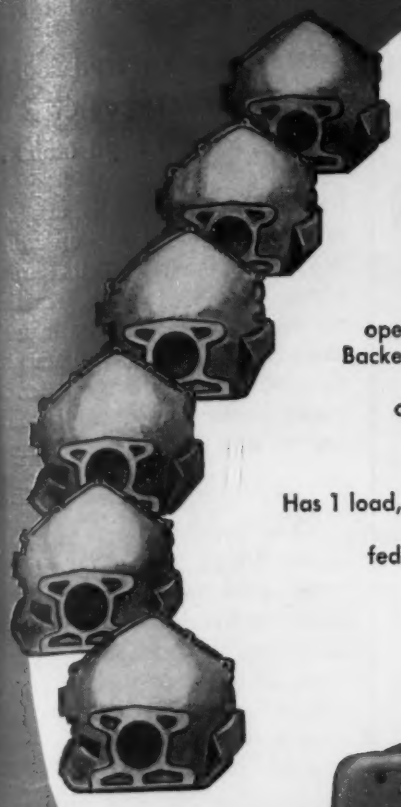
6080 OPERATIONS PER HOUR
with one operator

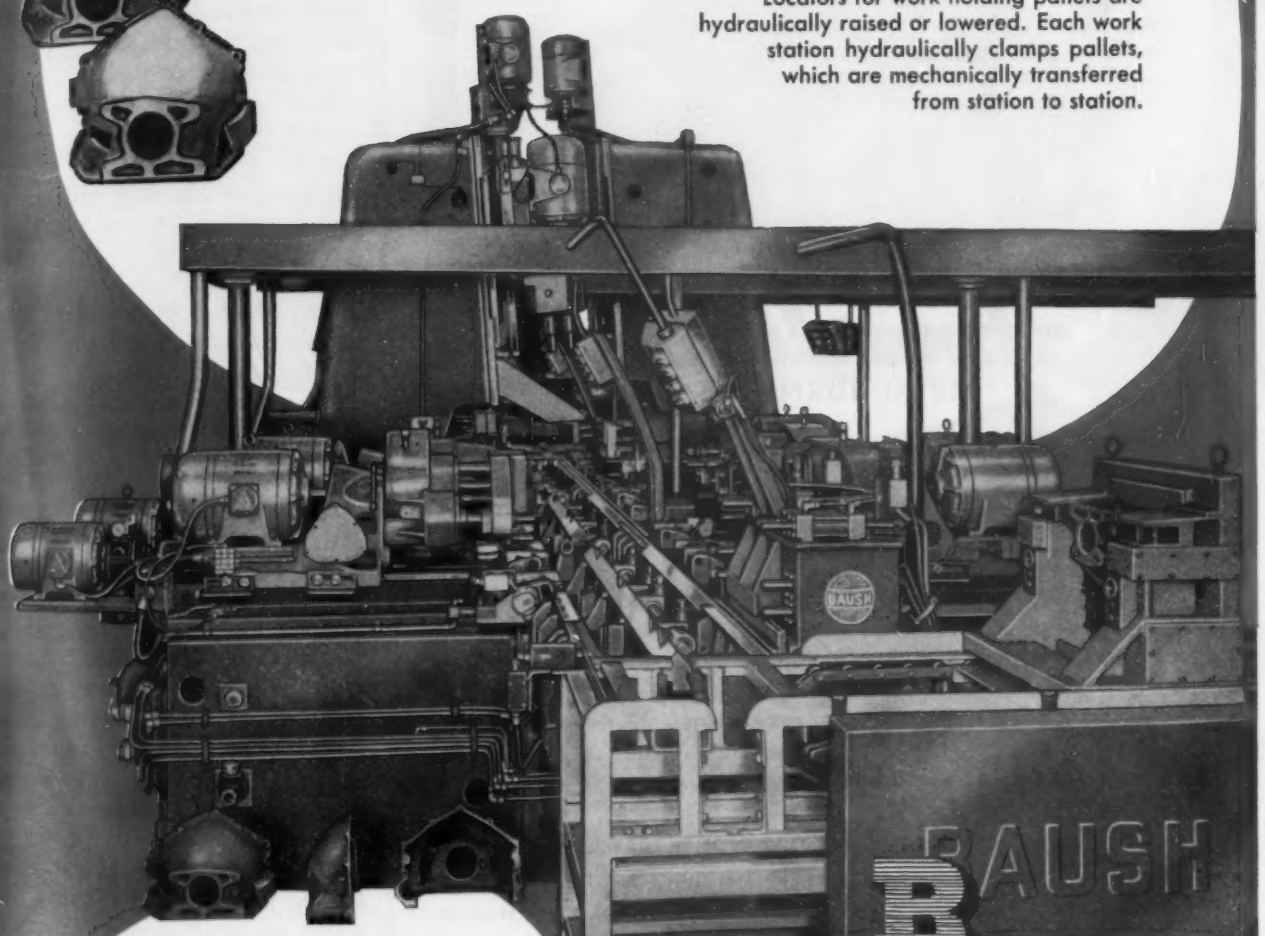
Baush 9-Station Mechanical Transfer speeds machining operations and lowers production costs on automotive clutch housings.

There's no questioning production efficiency and low costs when operations can be speeded and simplified in this way.
Backed by over 50 years of designing and building automatic machine tools, Baush Engineers can be of real help to you in solving your machine operations. Why not send us your prints NOW — there is no obligation, and our staff would enjoy working with you on your problems.

9-STATION MECHANICAL TRANSFER:

Has 1 load, 6 work, and 2 idle stations with 11 mechanical power units and 3-way checking fixture. . . . Three 3-position mechanical transfer bases are fed by automatic pallet conveyor with 11 pallets. Hydraulic clamping and unloading of part in work-holding pallets. Locators for work holding pallets are hydraulically raised or lowered. Each work station hydraulically clamps pallets, which are mechanically transferred from station to station.





OPERATIONS:

Drill, rough bore and ream, counterbore, spotface, chamfer and tap for a total of 64 operations in each clutch housing.

PRODUCTION:

95 clutch housings per hour at 100% efficiency, or a total of 6080 operations per hour with one operator.

BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

CASH IN YOUR CHIPS

Change Metal Turnings Waste into More Profitable Shoveling CHIPS

American METAL TURNINGS CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: $4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year (20 tons/month at $4 extra per ton)	$ 960.00
6,000 Gallons Recovered Cutting Oil at 30¢/Gal. (50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	$1,800.00
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	$ 300.00
TOTAL GROSS PROFIT	$3,060.00

American PULVERIZER COMPANY

Designers and Manufacturers of Ring Crushers and Pulverizers

WRITE for Metal Turnings Crusher Bulletin.

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

Simple conversion method gives advantages of 2 and 4 high mills . . .

4-high, the large rolls are separated and become backup rolls as two smaller work rolls are inserted between them. Initially, the machine is being built in two basic sizes: 1½ in. diam work rolls with 5 in. diam x 8 in. face width backup rolls; and a larger 2¼ in. and 8 in. x 8 in. size.

Gives Bright Finish

When functioning as a conventional 2-high unit, the relatively large work roll diameter is valuable for breakdown of ingots and bars, reduction of high luster strip, and for skin-passing of annealed strip. Because a larger work roll diameter causes greater slipping between roll surface and material, bright and highly burnished surface finishes can be obtained when reducing annealed strip.

An added advantage of the larger work roll diameter is its greater circumference which reduces wear, improves performance and lengthens work life between grindings.

Greater Reductions Possible

In flat rolling, prime advantage of the 4-high configuration is that with a given roll load capacity and mill horsepower, greater reductions may be taken with the smaller diameter work rolls. Also in rolling harder metals and alloys, the smaller work roll reduces the lateral spread, and lessens tendency of strip edges to tear or crack.

The "stiffness" of the backed-up 4-high mill and the ease with which its small work rolls can be "crowned," makes it possible to produce extremely accurate strip with practically no thickness variation across its width. The smaller work roll allows thinner strip-finishing gages even in highly work-hardened materials, since length of the flattened contact arc between the work rolls and material decreases with the

P&H OVERHEAD CRANES

This P&H Crane is one of 14 with Magnetorque control serving the Ford stamping plant in Buffalo, New York. A total 222 P&H Overhead Cranes serve the Ford Motor Company in all its plants.

At FORD . . as everywhere . . .

P&H Magnetorque® (crane control)

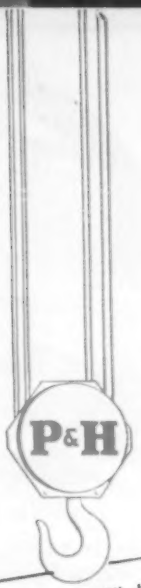
has proved itself!

Wherever you see these words, "Magnetorque Control" they stand for the finest in overhead crane performance. And, that means *proved* performance! . . . Proved in over 900 installations!

Developed and perfected by P&H, Magnetorque control has brought many outstanding advantages to crane users. First, it provides the finest speed regulation under all load conditions — with the convenience and economy of AC power — without harmful high motor currents. Second, it eliminates the mechanical load brake with all its costly service and replacement worries. Third, it assures more faithful, uninterrupted service — for many years to come.

Like all other P&H crane electrical equipment, Magnetorque control *is built by P&H* — specifically for crane service — *not adapted for it.* That is one of the reasons why P&H cranes deliver coordinated performance in all functions. It also explains why P&H delivers the most complete crane service in the industry.

Many leading American companies depend upon P&H for everything in connection with overhead cranes. You, too, will find that it pays!



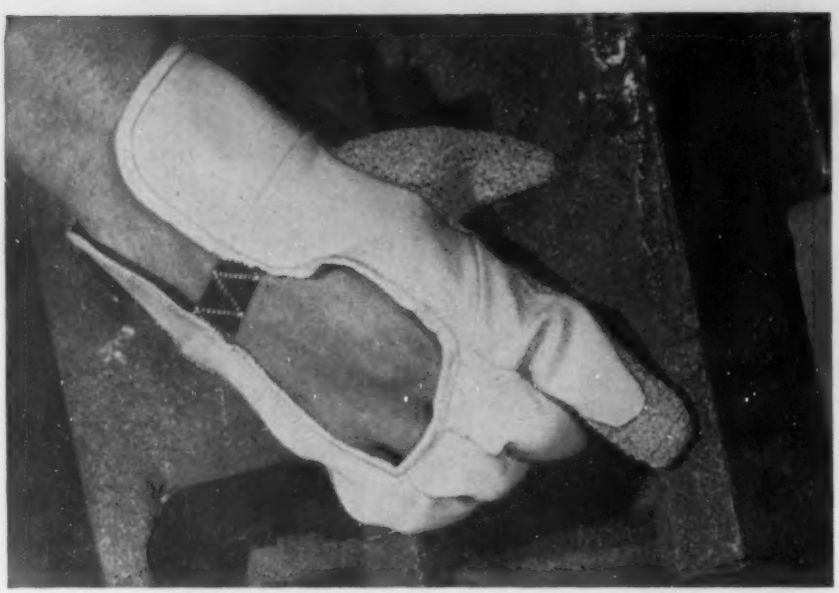
A new fact-filled bulletin about P&H Magnetorque AC crane control is yours for the asking. Write for Bulletin C39-1.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H Line



Cool Vent-Back Glove: Palm coated with sure-gripping, long-wearing, rough textured natural rubber.

Costs 40% to 70% less to protect hands with palm-coated gloves

Coated palms outwear canvas or leather palms. Fabric backs give comfortable ventilation.

NEOX No. 93

Handling sharp-edged materials, wet or dry: Palm-coated with NEOX (specially reinforced neoprene) which is unequalled for resistance to cutting and puncturing and does not absorb grease or oil. Job-fitted for handling such materials as strip and sheet metal.

Grappler No. 362

Handling abrasive materials, wet or dry: This Grappler glove is palm-coated with DUROX, a leather-like plastic that outwears ordinary plastics 50% and retains its grip when wet. Band top and knitwrist styles are also available in regular plastic coating. All Edmont plastic coated gloves have wing thumbs and best fit of any coated work gloves.

Grab-it No. 62-W

Handling sharp, abrasive or slippery materials, non-oily: Grab-it type, palm-coated with rough-textured natural rubber which has remarkable non-slip grip, as well as long-wearing qualities on rough work. Available in knitwrist style, also.

Free Test Offer to Employers: Send brief description of your operation, materials handled and temperature condition. We will recommend the glove (palm-coated or fully coated) that best fits your application, and forward samples free of cost, for testing on-the-job. Our laboratory also develops special gloves for special applications.

Edmont Manufacturing Company, 1234 Walnut Street, Coshocton, Ohio

World's largest maker of coated industrial gloves, available through all leading industrial suppliers.

Edmont

Edmont job-fitted gloves

Front and back strip tension can be varied according to requirements . . .

decrease in work roll diameter.

Roll loads and rolling torques can be reduced even further by using tungsten carbide work rolls.

Several Drives Offered

Depending on the required range and reduction speeds, the 2-high/4-high mill can be powered by a constant speed ac motor, a four-speed gearshift ac drive, an eddy-current clutch variable speed ac drive, or a variable speed dc drive. The motor mounted in the mill base drives the pinion stand through herringbone reduction gearing. The pinions drive the two large diameter rolls through silent universal spindles.

The mill's back-up drive is said to eliminate one disadvantage of the conventional 4-high mill—the limitation in torque transmission by relatively small roll necks and spindles. Another valuable feature of the back-up drive is its ability to overcome the lateral "bowing out" of the small work rolls when taking heavy reductions with high front tension.

Can Vary Tension

The method of providing front and back strip tension can be varied according to maximum strip pull requirements and coil build-up ratios. In the simplest non-reversing mill arrangement, back tension is applied by a friction brake on the pay-off reel. Variable front tension is obtained by driving the coiling reel from the main mill motor through an adjustable slipping clutch. Reversing mills can be equipped with a variable speed dc reel drive for more precise tension control. The improved reductions and strip flatness obtainable with front and back tensions permits successful cold-working of thin, hard metals.

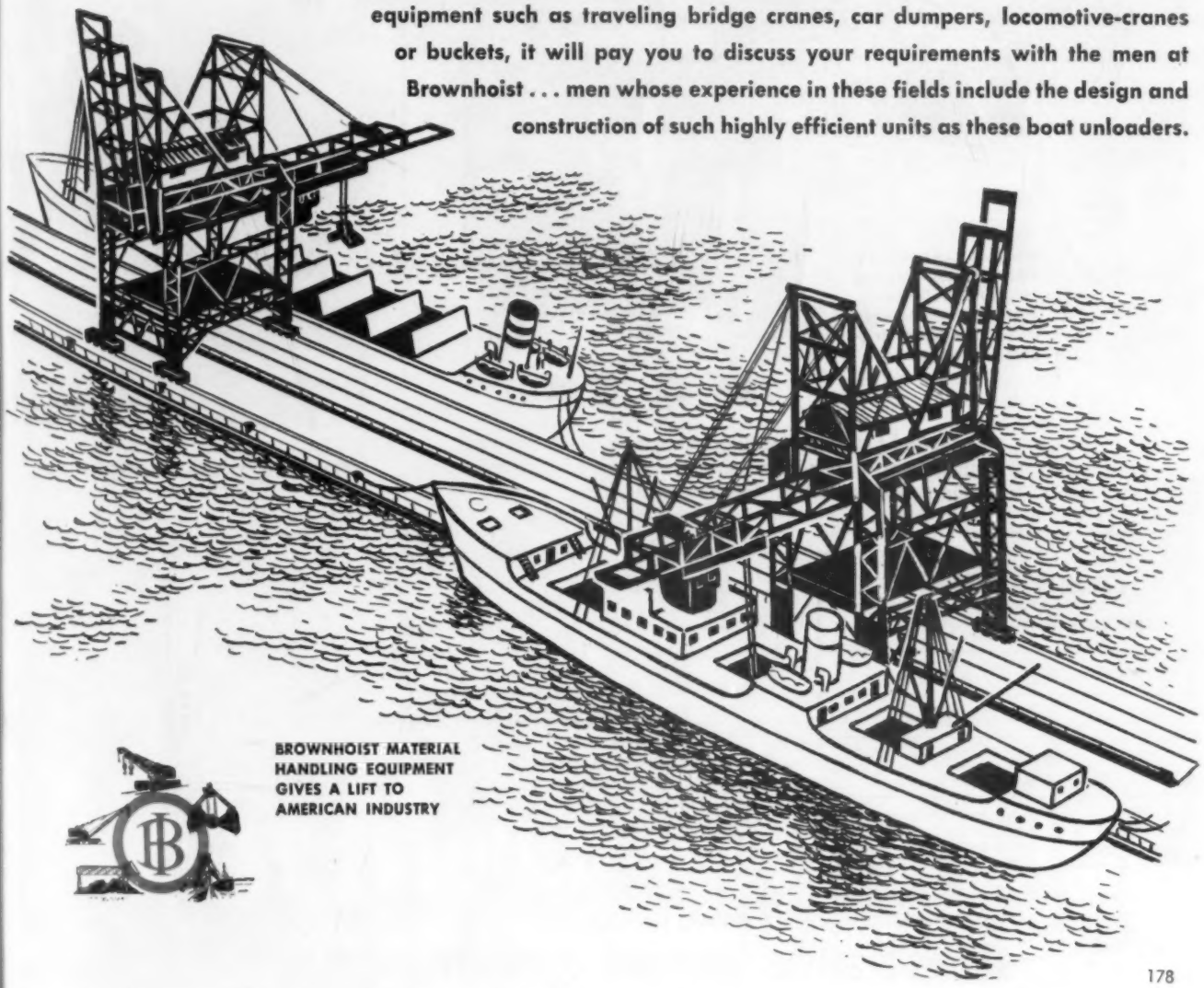
To accommodate heavy loads, housings of the Stanat mill are high-strength castings mounted on a fabricated steel plated base.

BROWNHOIST

ORE UNLOADERS handle up to 3600 tons per hour at the huge new pier of a large eastern railroad

Two Industrial Brownhoist Ore Unloaders, each with a free-digging capacity of 1800 tons per hour, provide this new pier for ocean-going ore vessels with the most modern and efficient unloading facilities in the United States. Towering over the pier like enormous drawbridges, the Brownhoist machines can travel the full length of the pier and lower apron extensions from either side to provide a reach 72 feet from the dock. Then huge buckets, capable of taking 25 tons of ore in a single bite, roll out on the aprons, return to drop their load into 100-ton receiving hoppers and roll back again for another bite. Elapsed time from bite to bite: just 45 seconds.

Whether your bulk materials handling operations call for ore unloaders or for other equipment such as traveling bridge cranes, car dumpers, locomotive-cranes or buckets, it will pay you to discuss your requirements with the men at Brownhoist . . . men whose experience in these fields include the design and construction of such highly efficient units as these boat unloaders.



BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

178

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

Welding:

Huge TV antenna has unique design, construction.

A record size TV antenna tower of unusual welded and bolted design is now being erected at Oklahoma City. At the 31 ft level, the triangular tower becomes straight sided, 12 ft on each face with one 30 ft bolted section piled on top of another until a 1490 ft level is reached. Then will come two RCA antennas, one 78 ft high and on top of that, a second 73 ft high for a total of 1572 ft.

The structure will weigh over 675 tons and rests on a series of thick steel slabs as shown below carried on a composite porcelain insulator able to withstand a crushing load of 11,200,000 lb. The insulator in turn is mounted in the heavy concrete foundation which contains 15 tons of reinforcing steel.

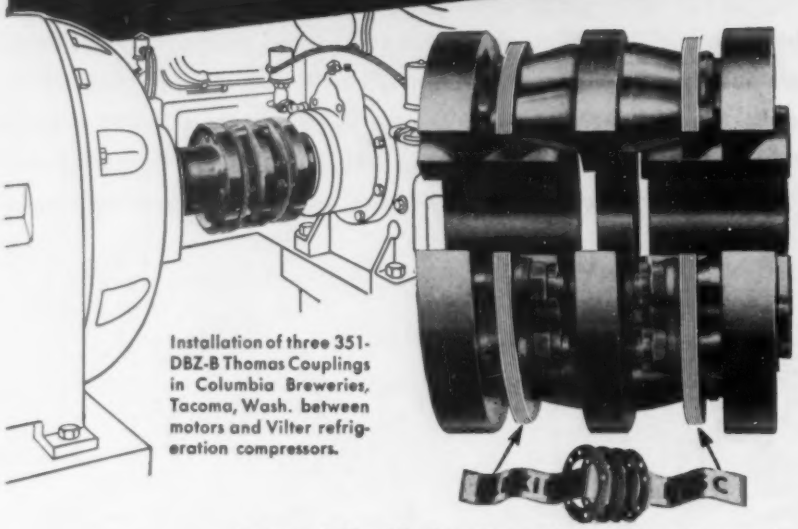
The unusual construction and design, developed by the Ideco Div. of Dresser-Stacey Co., Columbus, O., centers around main legs of solid steel rounds, ranging in diameter from 10½ in. down to 4½ in. except for the lower 300 ft of the tower which has legs of 14 in. wide flange H beams, 30 ft in length and believed to be the heaviest ever rolled. Each of these beams weighs 9300 lb.

Welding operations were performed using Lincoln Electric Co.'s Jetweld electrodes which carry a heavy refractory coating into which powdered iron is mixed.

Welding made simple . . .

Adding tower sections . . .

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

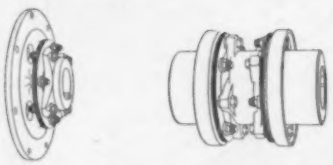


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

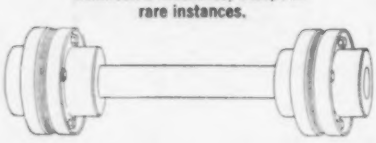
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

Magnesium:

Impregnating process improves corrosion resistance.

Magnesium's susceptibility to corrosion has frequently restricted its application. But a new impregnating process is said to increase the metal's corrosion resistance 300 to 400 pct.

Tests were conducted by Los Angeles testing laboratories using both magnesium alloy castings and sheet. These impregnated samples were subjected to continuous salt spray for periods up to 125 hours with no evidence of pitting or failure.

For Elevated Temperatures

Magseal, as the new resin process is called, was developed by Nu-Line Plastic Impregating Co. of Los Angeles. With this increased corrosion protection around rivet areas, and in alloy castings at service temperatures around 450°F, much greater utilization of magnesium is anticipated. The process has been particularly effective in corrosion protection of airborne radar equipment.

In the impregnating process, after the metal is removed from the autoclave all parts are rinsed in an alkaline type cleaning solution.

Resin Does Not "Weep"

Polymerization is done in a pressure bake oven at 275°F, under 100 psi. This heat under pressure does not allow the impregnant to weep, but keeps all the resin under the metal's surface. Upon removal from the oven all parts are placed in another alkaline type "stripper" solution that completely removes any remaining impregnant from all surfaces including tapped holes.

SHELDON
CHICAGO U. S. A.

OFTEN PAYS OUT ON THE FIRST JOB...

and gives additional years of "cost free" service.

In the past, lathes were generally bought as large and as heavy as possible to insure accuracy and sufficient power. Now, with accurate, low-cost Sheldon Precision Lathes, it is more profitable to buy these faster, cost-cutting lathes for the specific job at hand just as you would buy jigs and fixtures.

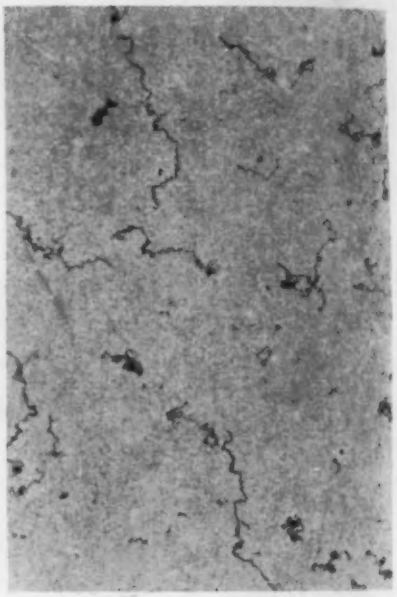
In savings of tooling costs, operator cost, power cost, and plant loading, as well as extra profits from more pieces per hour, Sheldon Lathes often pay back their cost on a single run.

Sheldon Lathes will work to the closest tolerances—have "Zero Precision" Taper Roller Bearings. They can take a healthy cut when operating at high speed direct drive—have double V-belts to the spindle. They will swing 10", 11" or 13" and have a 1⅜" hole through the spindle—have sufficient capacity for the great bulk of lathe work. Sheldon Lathes have created a new factor for figuring machinery costs. They are tools you should know about.

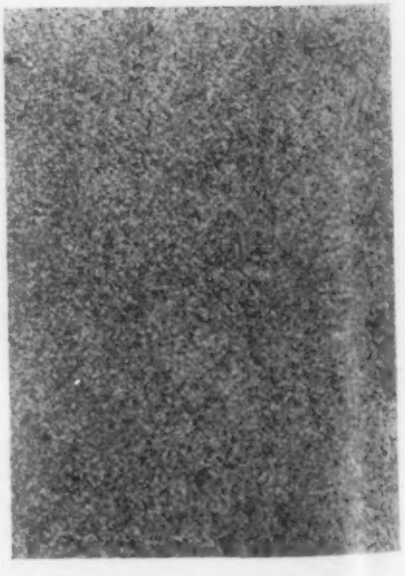
Write for Catalog

SHELDON MACHINE CO., INC.

4224 N. Knox Ave. Chicago 41, Illinois



Salt spray does this . . .



But not when treated . . .

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 145 or 146

New tool for preventive maintenance inspection

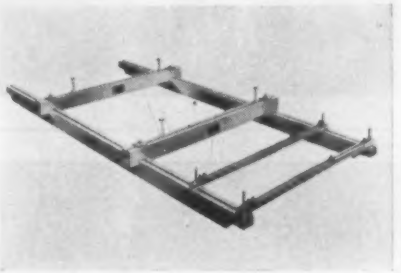
A different magnetic particle inspection kit offers light weight, portability and low cost. It is designed for preventive maintenance inspection, for weld inspection, and for limited volume inspection of any magnetic part wherever surface cracks are suspected. The Y-5 yoke kit weighs less than 30 lb. The yoke itself is the magnetizing and testing instrument and weighs only 7 lb. Magnaflux powder, powder bulbs, and operating instructions complete the kit. The Yoke is equipped with a 100 ft cord; draws 6 amp from any 110 v ac line. One man performs the inspection by himself. *Magnaflux Corp.*

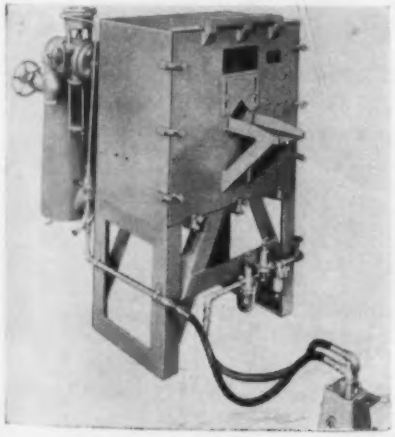
For more data circle No. 30 on postcard, p. 145.

New aluminum skid developed from standard shapes

A strong, lightweight aluminum extruded skid structure facilitates the handling and shipping of heavy industrial machines and equipment. The skid is made from standard shape extrusions of new high-strength aluminum alloy, cut to length. The skid is 60 pct lighter than comparable wooden skids and can be used with any type handling equipment, such as lift jacks, lift trucks, cranes, rollers, etc. Assembly takes only a few minutes, using wrench or pliers. *Harvey Aluminum*

For more data circle No. 31 on postcard, p. 145.





Hand-feed unit for removing scale from billets

The billet descaling cabinet illustrated is an efficient unit, specially adapted to situations where furnace and forging press are located close to one another, where a variety of pieces are to be handled, where only a part of the billet is to be descaled, and other situations where hand-feeding of the billet is the more practicable method. The unit is of welded steel construction throughout. The spray ring is fitted with 4 spray nozzles which completely encircle the billet. Nozzles are readily accessible for replacement when required. Unit can be supplied with necessary operating controls for use with existing accumulator system, or as a complete package unit including accumulator system. Automatic descalers are available with gravity or power-driven conveyor head; 6 spray nozzles. *American Steel Foundries, Elmes Engineering Div.*

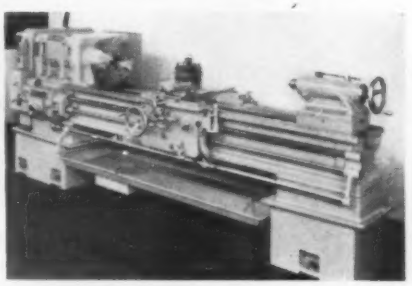
For more data circle No. 32 on postcard, p. 145.

More capacity and power feature 16-in. lathe engine

New 16-in. LA engine lathe is said to be heavier, more powerful, have more capacity, and to approach tool room lathes for accuracy. Headstock has shaved and hardened gears throughout, larger Timken anti-friction bearings, short shafts, wider gears. Helical drive gears assure smooth, powerful drive. Capacity is 18½ in. swing over the ways, 24 in. center distance on lathe with 6-ft bed. It has 12 or 24 spindle speeds ranging from 13 to 750 rpm. *Nebel Machine Tool Co.*

For more data circle No. 33 on postcard, p. 145.

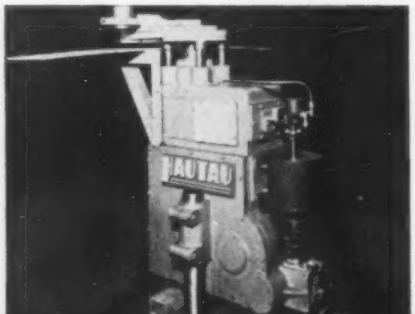
Turn Page



Adjustable Airebore gage kit has 3 to 12-in. range

With a new adjustable Airebore gage kit any size hole between 3 to 12 in. diam can be quickly and accurately inspected for size, taper, and out-of-roundness. The gage consists of a triangularly shaped spindle body to which are mounted a Plunjet gaging cartridge and these interchangeable components: centering foot, handle connector, length extensions, and adjustment screw. All contact surfaces are of tungsten carbide. The Plunjet gaging cartridge, connected to column type Precisionaire, provides 1000 to 1 amplification. The instrument is lightweight, quickly adjusted, and easy to use. It is self-centering and needs only to be rocked to ascertain the true diameter of the bore. *Sheffield Corp.*

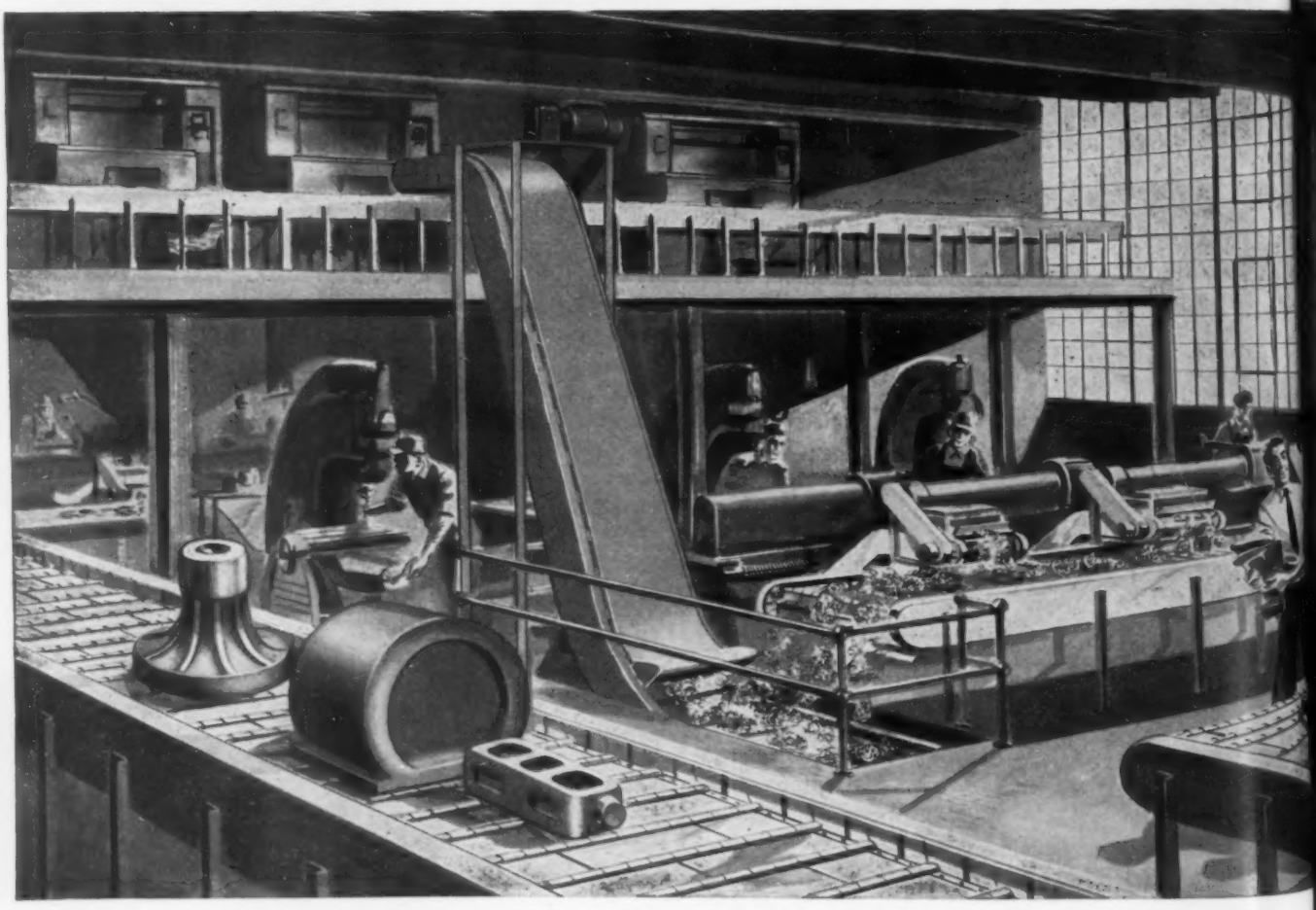
For more data circle No. 34 on postcard, p. 145.



Automatic loader for presses speeds part handling

New universal floor-type automatic loader for presses and vertical spindle machine tools speeds part handling and promotes safety. The motor-driven loader has two arms that are rotated through 120° motions, permitting it to pick up parts one-at-a-time from a conveyor line, deposit them in the press or machine tool and unload them onto another conveyor in a total cycle time of 2 sec. The conveyor-to-press model loads and unloads parts. With a single arm the loader acts as press-to-press loaders, automatically handling parts from one press to another in a line. Positive drive of the unit is practically instantaneous in its action and is easily synchronized with the press or machine tool through limit switches. *Hautau Engineering Co.*

For more data circle No. 35 on postcard, p. 145.



Head on milling machine may be set in three planes

This Gambin F27 milling machine differs from the conventional universal head type by the fact the head may be set in three planes. Not only does the head swivel and tilt, but the entire spindle assembly and arm slide, permitting the milling cutters to be positioned at any angle and at variable distances from the frame. Unequalled rigidity is afforded by the head being an integral part of the machine and the full 8 hp of the spindle motor is delivered to the cutters. Other features include optical gages graduated in 0.005 in.; 40 speeds, 22-2000 rpm; 36 feeds, ½ to 28 ipm. Controls are accessible from all sides of the machine. *Permasco, Div. of Winter, Wolff & Co., Inc.*

For more data circle No. 36 on postcard, p. 145.

Oxyacetylene outfit features double duty blowpipe

Lightweight, fully portable oxyacetylene outfit, called Prest-O-Lite welding and cutting outfit, features an exclusive all-in-one blowpipe with interchangeable welding and cutting tips. The same blowpipe heats, bends, solders, brazes, welds, and cuts. No special attachments are needed. As furnished, the outfit welds up to 3/16 in. and cuts through ⅜ in. of solid steel. Additional tips are available for welding up to ⅜ in. and cutting to 2 in. The blowpipe is perfectly balanced to give maneuverability and ease of operation. With tip of any size attached, it weighs only 17 oz; overall length is about 13 in. Quickly interchangeable tips enable one to switch from welding or brazing to cutting work in a matter of seconds. *Linde Air Products Co.*

For more data circle No. 37 on postcard, p. 145.

Turn Page

MAY-FRAN gives you greater economies in handling scrap and heavy abrasive materials

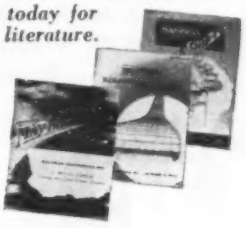
Whether you need a complete plant-wide system or a single scrap handling unit, MAY-FRAN can meet your requirements.

Two units form a complete MAY-FRAN materials handling assembly. The CHIP-TOTE automatic scrap conveyor removes borings, turnings and chips from high production machine tools while they are operating . . . thus eliminating shut-down time for manual scrap removal. Design features permit flexibility of installation according to type of machine tool, kind of metal scrap, rate of removal, etc.

The MAY-FRAN Hinged Steel Conveyor Belt transports scrap and heavy abrasive material to the disposal point. Precision formed, heavy gauge hinged-steel links are connected in horizontal rows by means of high-carbon steel rods. Side chains become an integral part of the belt, and outside links incorporate interlocking wings which remain positively engaged at all times. Link and rod construction eliminates fall-through.

For full utilization of vital machinery and skilled manpower, mechanize your handling of scrap and heavy abrasive materials with a MAY-FRAN automatic system.

Write today for literature.



MAY-FRAN ENGINEERING, INC.

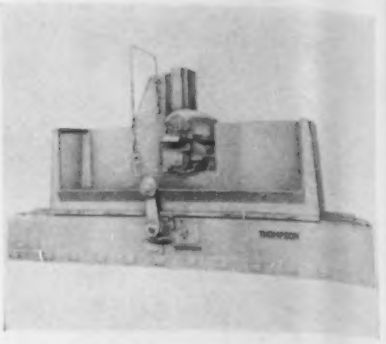
Designers and Builders of Complete Handling Systems

1698 CLARKSTONE RD. • CLEVELAND 12, OHIO

Extra power and precision for heavy duty production

While massiveness is the keynote of construction with heavy base and single column design, the Thompson CX hydraulic surface grinders provide rapid removal of stock while maintaining close limits and fine finish. Outstanding features are: cross feeding wheelhead with horizontal spindle grinding with the periphery of a 20-in. diam wheel; rapid and accurate positioning of wheel to work; simplified centralized control. Table speeds of all CX's are 10 to 100 fpm with vertical feed hand wheel graduated to 0.0005 and powered at 15 ipm; cross feed hand wheel graduated to 0.001 with power 1/32 to 3 in. *Thompson Grinder Co.*

For more data circle No. 38 on postcard, p. 145.



FOR A TROUBLE-PROOF FINISH--- START AT THE BOTTOM!

No buffing compound remains after this aluminum casting has been precleaned with a Magnus Emulsion Cleaner.

Removing buffing compounds or oily dirt films from metal surfaces is easily accomplished by precleaning with a Magnus Emulsion Cleaner. A simple dip or spray penetrates the grime, loosening it for easy removal with a water rinse.

Magnus Emulsion Cleaners are non-toxic, non-corrosive and have no unpleasant fumes. Cleaning is safe, dependable and economical.

A demonstration will open your eyes to the improvements in quality and the reduction in cleaning costs offered by Magnus Emulsion Cleaners. Write for information—no obligation, of course.

magnus

MAGNUS CHEMICAL CO., INC.
46 South Ave., Garwood, N. J.
In Canada: Magnus Chemicals, Ltd., Montreal
Service Representatives in Principal Cities

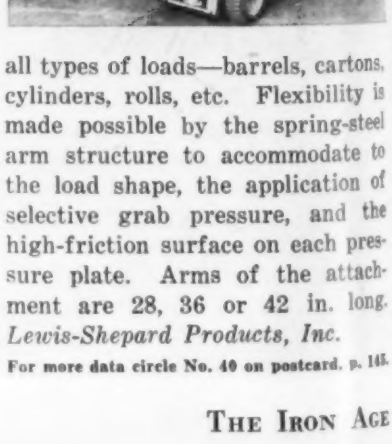
Retaining ring

New radially-applied retaining ring can be locked positively in its groove and used as a shoulder against rotating parts. It eliminates need for springs, washers and other accessory fastening devices. The ring is made of spring steel and is shaped like a bowed horseshoe. Sizes accommodate shafts ranging from ⅛ to ½ in. diam; larger sizes available for special applications. The ring is intended for use in automotive, electronic and aeronautical industries. *Waldes Kohinoor, Inc.*

For more data circle No. 39 on postcard, p. 145.

Hydraulic load grab

Diversification of loads is no problem with the hydraulic load grab attachment for fork trucks. It permits palletless handling of almost

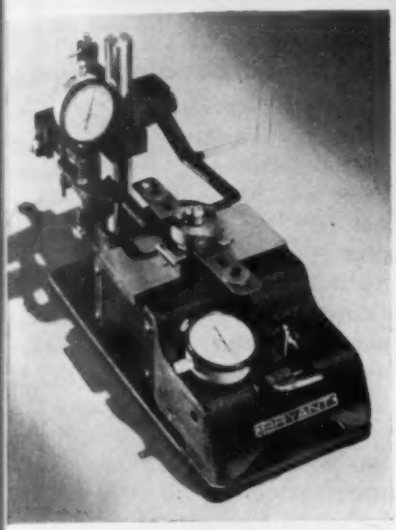


all types of loads—barrels, cartons, cylinders, rolls, etc. Flexibility is made possible by the spring-steel arm structure to accommodate to the load shape, the application of selective grab pressure, and the high-friction surface on each pressure plate. Arms of the attachment are 28, 36 or 42 in. long. *Lewis-Shepard Products, Inc.*

For more data circle No. 40 on postcard, p. 145.

Thread inspection

An accurate means of checking threads in all tolerance classes and in sizes ranging from 5/16 to 5 in. diam for internal threads and No. 8 to 5 in. diam for external threads is provided by a new model bench gage. Gaging contacts are a pair of threaded segments: similar



to a split plug for internal threads; a split ring for checking external threads. Segment pairs are interchangeable on the basic gage. Both Go Form and Pitch Diameter segments are also available with the Model 21. Go Form segments provide a reading of pitch diameter which includes variation in thread form and lead. It is an assembly-ability check. *Bryant Chucking Grinder Co.*

For more data circle No. 41 on postcard, p. 145.

Core coatings

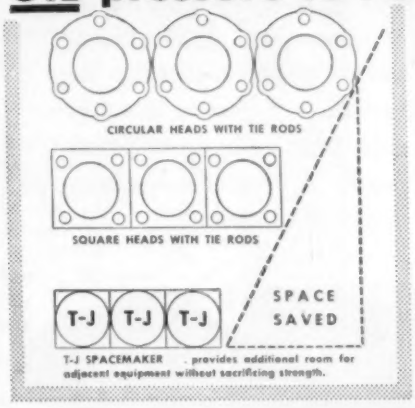
Yellow Jacket core wash is a fine, yellow colored, carbon free, dry powder type coating for cores and molds for steel, iron and nonferrous castings. Easily mixed with water, it has excellent suspension from 40° Baumé up. Peneseal core coating is a fine, graphite base, dry powder type wash for iron and nonferrous casting cores. It has excellent suspension over a wide Baumé range, and may be prepared to allow fast drying of the core coating. *Frederic B. Stevens, Inc.*

For more data circle No. 42 on postcard, p. 145.

Turn Page

T-J Spacemaker CYLINDERS

OIL pressure to 750—AIR to 200 P.S.I.


CIRCULAR HEADS WITH TIE RODS
SQUARE HEADS WITH TIE RODS
T-J
T-J
T-J
SPACE SAVED
T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

Now the sensational new T-J Spacemaker sets the pace in compact cylinder design and efficient performance!

New "Self-Aligning" adjustable oil cushion means faster acceleration and better cushion than ever before . . . New T-J Super Cushion Flexible Seals for air insure positive cushion with automatic valve action for fast return stroke.

More plus features include—heavy wall, precision honed, hard chrome plated, seamless steel body . . . leakproof cylinder head to body construction . . . heavy duty, high-tensile, *hard chrome plated piston rod.* Write for bulletin SM-454-2. The Tomkins-Johnson Co., Jackson, Mich.

T-J TOMKINS-JOHNSON
RIVITORS . AIR AND HYDRAULIC CYLINDERS . CUTTERS . CLINCHORS

Vibratory polisher produces highly polished surface

A simple, easy, mechanical method for lapping and polishing metallurgical samples, metallic sealing ring faces, and other metal parts requiring a highly polished surface is found in new vibratory lapping - polishing machines. They handle many samples in one operation, producing better finish in one-third the time necessary to produce one sample by hand. The vibrating bowl can be lined with whatever polishing cloth is desired for a specified finish. Finger-tip control of vibration regulates polishing speed. Bowl sizes range from 5 to 24 in. diam. *Syntron Co.*

For more data circle No. 43 on postcard, p. 145.

Carburizing furnace

Automatic operation is an outstanding feature of the new Stewart Autocarb. Temperatures, once set, are automatically held uniform. Carbon potential of the protective atmosphere is automatically and continuously maintained by newly designed atmosphere generator. The new package unit has pushbutton operation. It is said to eliminate expensive salt pot cyaniding, pack carburizing, and improves ordinary clean hardening processes. *Sunbeam Corp. Industrial Furnace Div.*

For more data circle No. 44 on postcard, p. 145.

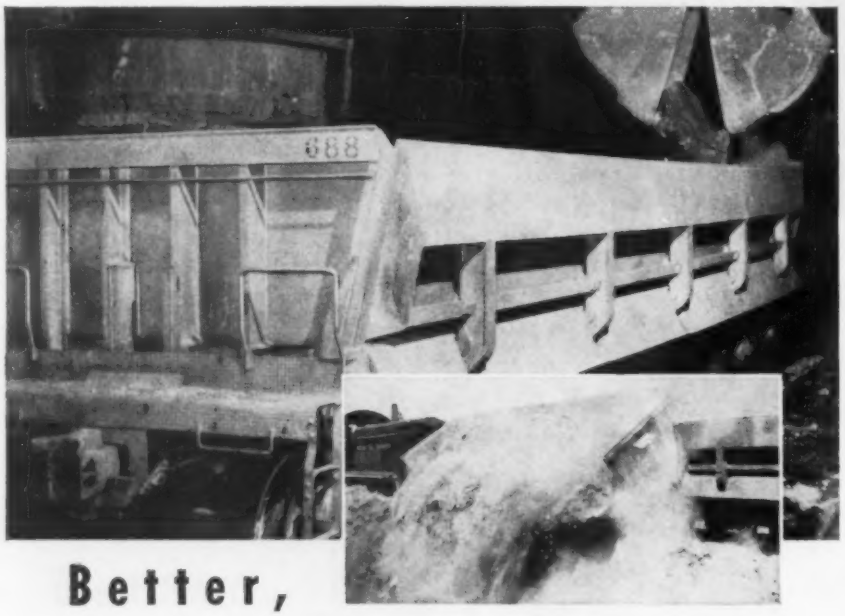
Resistance welder

Low cost, 1 kva, small parts resistance welder with dual heads can be quickly and independently adjusted for pressure, time and heat in progressive assembly work.

Electrodes and holders are adjustable in all directions permitting a wide variety of setups. The welder is a complete package unit. It handles strip and wires up to 1/32 in. *Royson Engineering.*

For more data circle No. 45 on postcard, p. 145.

Turn Page



Better, More Economical . . . via DIFFERENTIAL

The yawning bucket drops a huge chunk of waste into this Differential Air Dump Car. Next time the "Sunday Punch" may be tons of reddish hot slag.

For day in, day out service under the rigors of steel mill loading practice, these Differentials perform to the point where steel mills are buying more and more every year.

Unusually rugged design and construction, plus heat resistant floors, when indicated, are part of the answer. Out at the dump it's a matter of seconds to unload completely anything that can be loaded — dumping to **either** side. It all adds up to better, more economical transportation **via Differential.**

Send for detailed specifications!

DIFFERENTIAL PRODUCTS INCLUDE: Air Dump Cars, Charging Box Cars, Ingot Mold Cars; Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

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STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915—PIONEERS IN HAULAGE EQUIPMENT

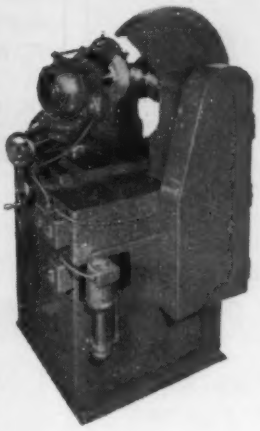
A PENNY SAVED IS
PROFIT EARNED

WITH YOUR
RUTHMAN
GUSHER
COOLANT PUMP

Low in initial cost, efficient in operation, you can depend on your Gusher Coolant Pump for *economical* operation.

1—They use less power when throttled and require no packing or priming.
2—Pre-lubricated heavy-duty ball-bearings reduce maintenance attention.
3—Electronically balanced rotating assembly cuts wear through vibration to a minimum.

For economical, efficient, long lived Coolant Pumps always specify Ruthman Gusher Coolant Pumps.



Illustrated is a CC-4S Rogers Circular Knife grinder equipped with a Gusher Coolant Pump.

THE RUTHMAN MACHINERY CO.
1809-1823 Reading Road Cincinnati 2, Ohio

TO YOUR SPECIFICATIONS
GRIFFIN
COLD ROLLED
STRIP STEEL

½" to 19" Wide
.002 to .500 Thick

Desired quality for forming and drawing.
Consult with us on your next cold rolled strip steel requirements.

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13400 North Mt. Elliott Detroit 12, Mich.
3000 West 51st St. Chicago 80, Ill.
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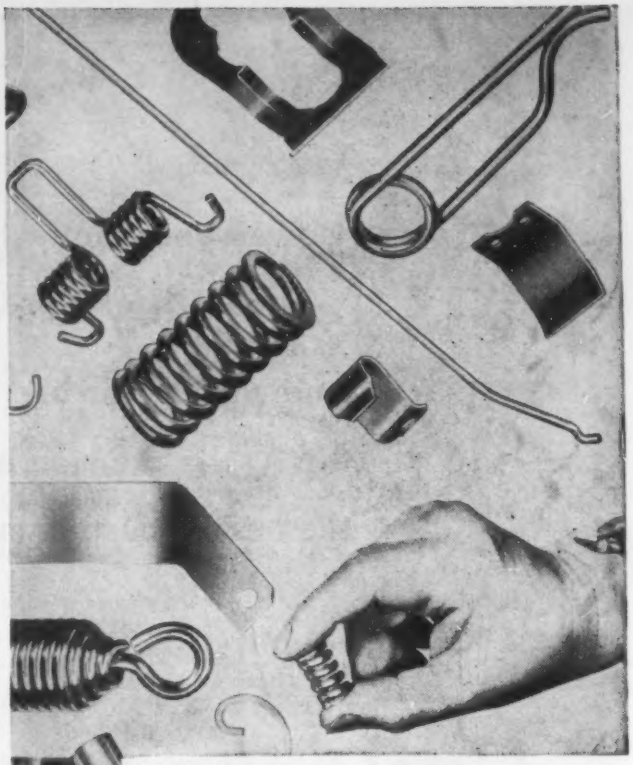
GRIFFIN MANUFACTURING CO. • ERIE, PA.



COIL SPRING SAYS:

Price vs. quality . . . with U. S., there is no choice. When considering springs, small wire forms and small metal stampings, your assurance of quality is our reputation for closest quality control—and for meeting specifications exactly. The price is bound to be competitive, because our production facilities are the most modern of their kind. That's why it pays to call U. S. for springs, *every time*. A call or letter today will answer your needs.

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And smart gear users know
this CINTI is the sign of
the best in custom made gears.

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THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

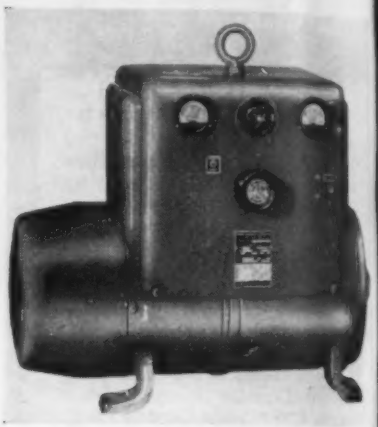
The parts are all made and on their way. Now I can go on my vacation thanks to you Pete and your favorite Columbia ATMODIE.

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.
Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

High cycle power source

New line of motor generator frequency changers is designed to convert 60 cycle current into a 180 or 360 cycle power source for operating high cycle tools. The sets, in 5, 7.5, 10 and 15 kw capacities are



compactly designed, of two-bearing construction with the motor rotor, exciter armature, and revolving field mounted on a solid steel shaft, dynamically balanced for quiet operation. Monitor top houses all motor and generator controls and instruments. *Motor Generator Corp.*

For more data circle No. 46 on postcard, p. 16.

Parts bins

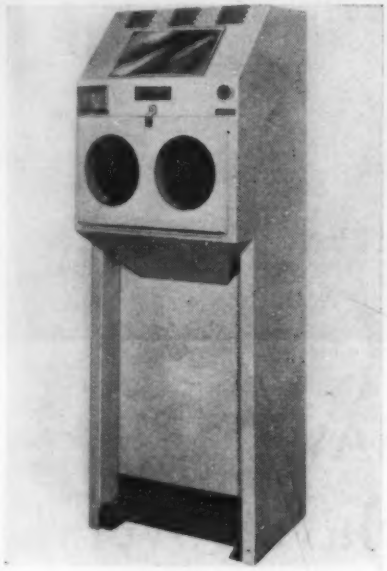
New vertical Work-O-Matic Parts Bins position small parts in half the space regular tote pans require. Hanger angles on the bins permit

them to be hung at work stations. Seven sizes measure 6 in. front to back on the bottom and top. Hopper front is 3 in. deep. Largest bin is 18 in. wide x 24 in. high; smallest, 6 in. in height and width. *Union Metal Mfg. Co.*

For more data circle No. 47 on postcard, p. 16.

Low-cost model

Known as the Pressure Blast, Jr., this wet-blast equipment was designed for multi-unit installation in the larger plant or the smaller shop where the compressed air supply for the operation of this type of equipment may be low. The equipment may be operated in conjunction with a 3 hp compressor. Features include a motor-driven paddle-type agitator for the water and abrasive mix; self-supporting trigger gun to reduce operator fatigue; foot pedal window wash actuator; full stainless steel construction. Heavy duty blower permits exceptional visibility while operating. There is no pumping mechanism in the blast circuit. A venturi in the blast gun raises the abrasive and water mix up from the hopper. *Cro-Plate Co., Inc.*



For more data circle No. 48 on postcard, p. 145.

Insulating tool dip

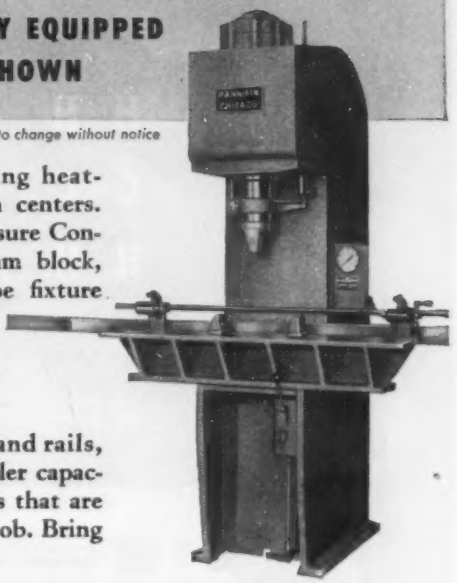
Tough, high dielectric strength dipping compound for insulating and protecting tools and equipment eliminates the need for taping tool handles. Items to be protected need only be dipped in the compound, permitted to drain and dry —a 15-min operation. Three successive coats an hour apart are recommended for 110 to 220 v exposure. Comes in red or black to identify protected tools. *Insl-X Sales Co.*

For more data circle No. 49 on postcard, p. 145.

This 25-TON Hannifin Straightening Press Sells For

$4,179 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice



The ideal press for straightening heat-treated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

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HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

adds a magic touch

Hendrick Ornametal

More and more metal fabricators are realizing the sales benefits that stem from using Hendrick Ornametal in their product design. Whether you require perforated metal for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers or similar applications, you can be certain there's a Hendrick Ornametal design suited for your exact needs.

Lightweight and supplied in special bright finish Hendrick Ornametal is made of cold rolled steel suitable for painting or plating. For more complete details, contact Hendrick direct.

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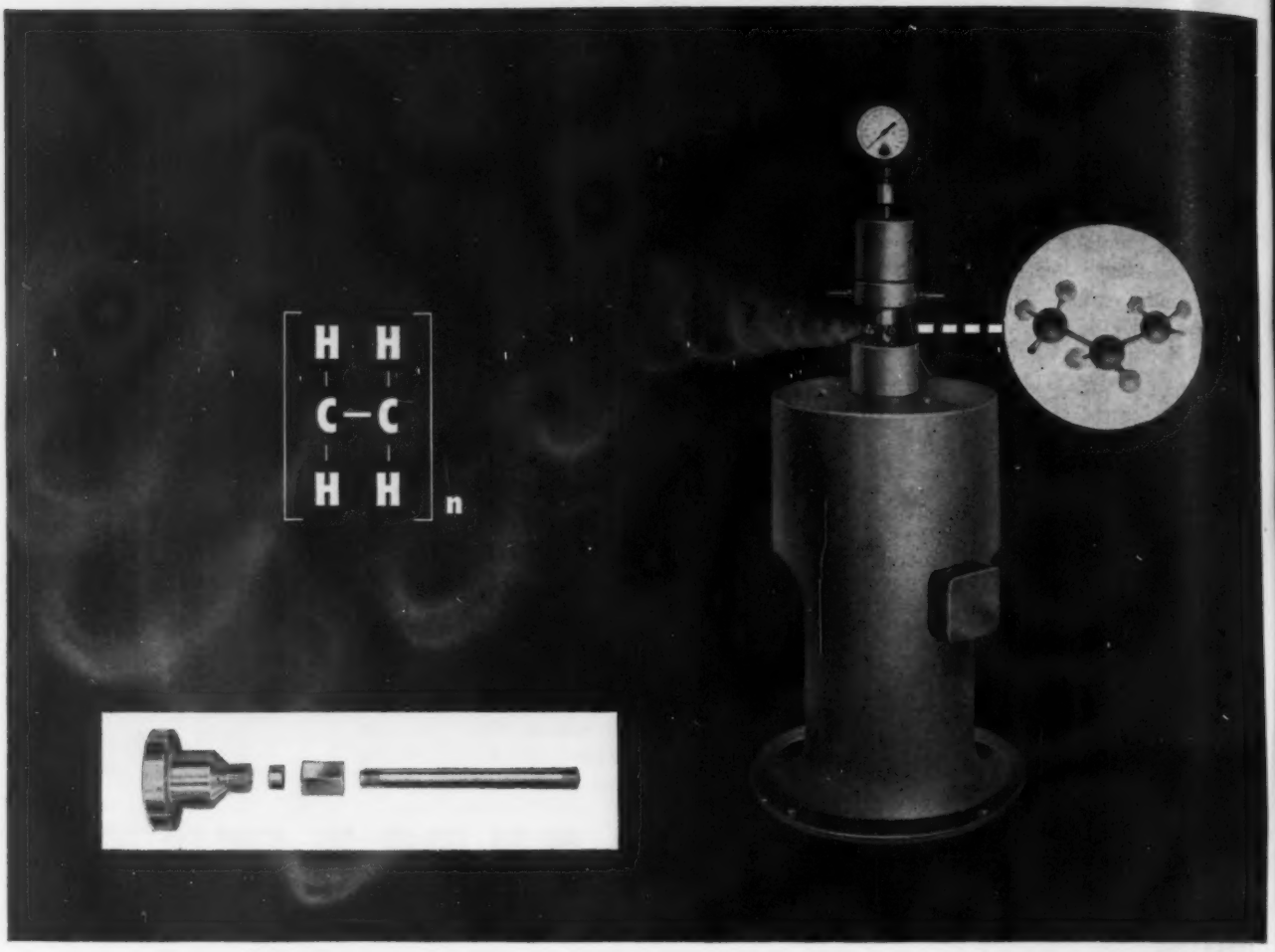

TUBING BY SUPERIOR SAVES 33% on production cost of Autoclave covers!

Shown here is the Magne Dash* autoclave, a "dash pot" used to test physical and chemical properties of materials under high pressures.

The Magne Dash cover now costs far less to make than it used to. For in redesigning it, Autoclave Engineers, Inc., Erie, Pa. found that Superior cold drawn Type 316 stainless steel tubular component gave them amazing economies. Savings 33%.

Originally, 2" stainless steel forgings were used in the Magne Dash cover. These had to be machined and deep drilled—time-and-money consuming operations. Superior tubing eliminated this expensive work and reduced scrap loss almost to zero! At the same time, minimum yield strength was raised from about 40,000 psi to 100,000 psi. And Autoclave Engineers found Superior tubing easy to thread, easy to clean and unusually resistant to corrosive catalysts used in testing.

If you have a problem in high pressure processing—or any other problem that involves tubing—call on Superior. We make a specialty of fine tubing—in special shapes and sizes—and in more than 55 analyses! Out of our long experience, you are sure to get the answers you want. Tell us about your current production problem. Send for our free Catalog Section 20 on stainless steel tubing. Superior Tube Company, 2004 Germantown Ave., Norristown, Pennsylvania.

*Licensed by Standard Oil Company (Indiana) U.S. Patents 2631091 and 2661938

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

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All analyses .010" to ⅜" O.D.
Certain analyses in light walls up to 2½" O.D.

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

The Iron Age SUMMARY . . .

Production expected to climb again after being held in check by holiday . . . Scrap prices stiffen in several market areas.

Production . . . Steelmaking operations are expected to climb again next week after being held in check this week by the Labor Day holiday. But the outlook is for a gradual climb in production over the next 3 months.

New Orders . . . Some steel orders for new auto models are beginning to trickle in, although they are not expected to hit high volume until October. By that time auto orders, which have recently been very slow, are expected to be one of the strongest factors in the market.

Sluggish flat-rolled demand is also getting a boost from appliance makers who are raising their buying—some by as much as 50 pct. By November customers may have to wait as long as 5 weeks or more for delivery of cold-rolled sheets, compared with less than 4 weeks today.

Tinplate demand, which had started to ease, is coming on again. This is also helping to firm the sheet market.

Galvanized sheets are still tightest of all flat-rolled products, being supported by the grain bin program, construction, air conditioning, and farm demand.

Consumption . . . Despite a gradual increase in new orders, steel consumption is still running ahead of production. Some purchasing agents are holding off buying steel as long as possible in the hope that lower prices might be offered. There's no doubt a lower offer could bring out some sizable orders. But there has been no break in the steel base price front. And there is no indication that consumers will be able to add any additional price concessions to freight absorption advantages they have already won.

Scrap Prices . . . Better outlook for steel production is reflected in a stiffening scrap market. Prices are up this week in several areas where consumer resistance had been holding the market in check. Increases this week raised THE IRON AGE Steel Scrap Composite Price 33¢ a ton to $29.00 per gross ton.

Although consumer stocks of scrap are still in good shape, better grades of steelmaking scrap are not abundant. Exports have siphoned off some prime material near coastal areas; vacations and the general summer lull in manufacturing have curbed the supply of industrial scrap; and reduced incentives have generally slowed collections the past several months. Result is that consumers finally found it necessary to pay more to bring in good grades of steelmaking scrap.

Steel Output, Operating Rates

Production	This Week†	Last Week†	Month Ago	Year Ago
(Net tons, 000 omitted)	...	1,549	1,525	2,012
Ingot Index (1947—49=100)	...	96.1	94.9	125.2
Operating Rates				
Chicago	67.5	69.0	70.5	99.5
Pittsburgh	64.0	64.0*	61.0	94.0
Philadelphia	56.0	56.0	56.0	96.5
Valley	63.0	64.0	58.0	97.0
West	75.0	77.0	79.0	92.5
Detroit	74.0	74.0	62.0	99.0
Buffalo	56.5	56.5	56.5	35.0
Cleveland	59.5	51.0*	67.5	95.0
Birmingham	68.0	69.0	64.5	99.5
S. Ohio River	79.0	74.0	72.0	85.0
Wheeling	77.0	77.0*	86.0	101.0
St. Louis	56.0	56.0	54.5	94.0
East	31.0	47.0	47.0	76.0
Aggregate	64.5	64.5*	64.0	89.5

* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.801	4.801	4.801	4.634
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$56.76
Scrap, No. 1 hvy (gross ton)	$29.00	$28.67	$27.83	$38.67
Nonferrous				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.50
Lead, St. Louis	14.05	14.05	13.80	13.80
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	92.75	92.50	95.00	82.75
Zinc, E. St. Louis	11.50	11.00	11.00	10.50

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steel for any part
you make for any product
anytime at minimum cost!

Solar is proud to furnish some of the steel for this leading line of Fully Automatic Clothes Washers and matching Clothes Dryers. Turn the ad upside down for the manufacturer's name— General Electric

"for service dependable as the sun"

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FLAT ROLLED AND BAR AND TUBE STOCKS AND PROCESSING SERVICES FROM 11 PLANTS

Market Gets Automotive Nibbles

Steel producers report that August was a bit better than July . . . Most markets still hang on dead center . . . Auto industry starts to get its feet wet with some small orders.

◆ ALTHOUGH the steel products order picture still appears to be on dead center where it's been for the last months, there are some whiffs of smoke from automotive purchasing offices. That means, say the experienced producers, a steady blaze of orders later in the fall.

Man-to-man contact with steel consumers gives producers definite hope for an improvement in fourth quarter, but a difference of opinion is now apparent over whether September will be much of a production month. The next week probably will tell the story in that respect.

Reports from virtually all production centers are that August was a better order month than July, but these observations are qualified by the fact that July was so poor that anything would be an improvement.

The automobile producers still hold the key to the difference between the mild improvement noticeable in the last several weeks and the order volume needed to step up production to a decent level.

Indications are that one of the Big Three auto makers will begin placing some advance business within the next week. The two biggest producers may re-enter the market soon. But the small independents, heavy on inventory and short on orders, may not become significant factors in the market for a month or so.

The warehouse business is spotty, although overall there appears to be a slight improvement in the making. Sheets continue soft with exception of galvanized. The picture on structurals and plate is largely unchanged. Bars show no definite sign of improvement.

SHEETS AND STRIP . . . Galvanized continues to set the pace. In the **East**, hot dip galvanized is booked 4 to 5 weeks ahead, while continuous hot dip is as much as 10 weeks into the future. A similar galvanized picture exists in **Chicago**, where one out-of-district producer has little to offer before late December. Behind the galvanized boom are grain bin programs, construction, heating, and air-conditioning duct work. In the East, uncoated sheets are running about 75 pct of 1953 business volume. Cold-rolled in **Chicago** is on a 4-6 week basis, with cold-rolled strip somewhat easier; hot-rolled sheet and strip are unchanged at 2-3 week delivery. A mild improvement is noted at **Pittsburgh** and **Cleveland**, but market continues dull at **Detroit**.

BARS . . . **Detroit** salesmen are encouraged by an influx of orders for hot-rolled from small consumers and a few auto parts suppliers; the slight improvement is general, with no single market factor responsible. Reinforcing bars are holding up well in the **East**, but prices are soft; carbon bar business is off about 5 pct from July. **Chicago** reports little change, and cold finished bar is one of the weakest items; after a slight spurt, a farm buying is again sliding off. On the **West Coast** bars are holding steady with little change. In **Pittsburgh** and **Cleveland**, all types of bars are strongly competitive, and some business is being placed strictly on basis of prompt delivery.

STRUCTURALS AND PLATE . . . Structurals may be on the verge of a seasonal dip as the construction season approaches an end. A hint of this comes from **Chicago**, where business continues good but many consumers are reducing inventories; one fabricator began cutting back his orders week before last, and while the cut was small it is expected to continue for some time. In the **East**, where heavy highway and bridge construction maintained the structurals market, August tonnage may be off slightly from July; price competition is still keen; a bright spot is an order placed by the Pennsylvania Railroad with Bethlehem Steel for 200 piggy-back railroad cars. Structurals market in **Pittsburgh** and **Cleveland** considered fair but consumers are playing inventories close to the vest. The plate market is still strongly competitive. In **Chicago**, plates are on 2-3 week delivery with some spot tonnages available for immediate shipment. On the **West Coast**, mills are busy filling recent orders for refinery and pipeline projects.

TUBULAR PRODUCTS . . . The market shows little change. Oil country goods are firm; construction products are showing signs of weakening; merchant pipe is fair but still competitive on basis of delivery.

WIRE . . . A mild pickup in manufacturers wire in past week noted in **Chicago** area. In the **East**, nail producers are doing well despite foreign competition; manufacturers wire is slow, off about 5 pct from July. **Pittsburgh** mills report manufacturers wire is fair, but merchant wire is sliding seasonally.

WAREHOUSES . . . The warehouses are still plagued by below-mill-price sales of secondary flat-rolled products. And there is no sign that this situation will ease in the near future. **Chicago** hears occasional reports of slight improvement but this is not backed up by heavier mill purchases.

REFRACTORIES . . . Refractories producers have increased prices of fire clay and silica brick $5 per thousand, effective Sept. 1. The increase reflects higher labor costs resulting from recently-signed contracts. Bulk materials are up $1 per ton. Basic and insulating brick prices remain unchanged. Due to earlier increases, silica and fire clay brick for coke oven use also are unchanged.

Purchasing Agent's Checklist

ORE: Open new iron deposits on Belcher Islands . . . . . p. 76

TACONITE: Processing at Reserve's mine starts soon . . p. 78

ATOMIC ENERGY: Increased participation for industry p. 83

TOOLS: Shipments down $100 million in first half . . . . . p. 107

Boost Lead, Zinc Stockpiling

General Services Administration asks more offers of domestic lead, zinc for stockpiling . . . Denies fast action earlier . . . Mum on tonnage—By *R. L. Hatschek.*

◆ THE General Services Administration is seeking additional offers of domestic lead and zinc for stockpiling purposes.

The agency says reports that it accepted immediately the initial offerings made in response to its request last week are unfounded. GSA terms its call for quotations on further tonnages at this time as part of its normal procedures.

Federal buying of lead and zinc has edged up since June. GSA does not reveal the exact quantities being bought, but estimates indicate the purchase of about 10,000 tons of lead and 15,- tons of zinc in the past month.

GSA's buying program is now being conducted in keeping with President Eisenhower's call for heavier purchasing of these metals for long-term stockpiling.

Asked for in the latest General Services Administration request for offers is an undisclosed quantity of lead and zinc to be delivered not later than Nov. 15. The tonnage to be bought will come from ores mined since Apr. 1.

As outlined by the President, the stepped-up program could involve government purchases of up to 200,000 tons of lead and 300,- 000 tons of zinc by next June 30. While the GSA procurement will follow this overall plan, the agency will not necessarily divide its orders equally on a 12-month basis.

If the domestic purchases he has recommended are not adequate to stimulate the U. S. mining industry, Mr. Eisenhower said last month, he will be prepared to consider more drastic action.

The necessity for building a long-term stockpile of strategic goods has been stressed by the President since last spring. He advocates the plan as both an aid to the hard-pressed domestic mines and an insurance measure in case of the loss of supply sources during a national emergency.

COPPER . . . Settlement of the strike at Kennecott Copper Corp. last week brightened the picture for copper users considerably. Workers started back on the job Wednesday, Sept. 1, after agreement was reached late Tuesday. During the work stoppage more than 11,000 were off the job.

Terms of the settlement called for a 5¢ per hour wage increase and improvements in shift differentials and modification of the hospital medical plan. Total amount of the increase is 7.7¢ per worker per hour.

Strike at Kennecott's El Teniente mine was still in effect early last week and in support of the walkout at Kennecott a general strike of Chile's copper industry was called for Sept. 6.

There was a sharp price boost in London last week with spot metal going up to £246 (30.75) before easing off again to £244.

MERCURY . . . Extreme scarcity of mercury, regarded by many as the most severe on record, forced prices up to a new high of $298 to $300 per flask for small lots. This amounts to a $3-$5 increase over previous quoted prices. Trade sources indicate prices may go up even more.

MAGNESIUM . . . Latest report on magnesium shipments shows that in June for the first time in many months, shipments of all classes of magnesium cast products moved up. Total for June amounted to 1017 tons against 869 tons for the previous month. June '54 shipments, however, trailed last June's pace of 1568 tons.

Sand cast shipments in June '54 amounted to 619 tons, an increase of 580 tons over May. This represents a gain of only 6.7 pct, but trade sources regard the fact that it reversed the downward trend which has continued throughout this year as an indication the slump may be over.

Primary magnesium ingot output in July hit 6049 short tons, a drop from June production of 6190 tons.

Reaction from the unexpectedly high shipments of magnesium wrought products registered in June is evidenced in July. July shipments of 516 tons are off 21 pct from the previous month total of 656 tons. Vacations in July and the resultant "holds" on deliveries were an important factor in the reduced figure. It is believed late summer and early fall will see an upward trend in all wrought product shipments.

LEAD . . . Producers were encouraged by General Services Administration announcement that it is seeking additional offers for stockpiling. They are also anticipating increased buying from battery manufacturers who are now approaching their busiest season.

ZINC . . . Demand is strong with producers indicating good tonnages were involved in most sales. GSA is accepting just about all offers that are being made and it's estimated sales to GSA this month may hit 18,000 tons compared with the 15,000 orders of the past few months.

Prices were increased by ½¢ per lb late last week on the strength of better market demand and outlook for increased stockpiling. Not all sellers moved at once however.

TIN . . . Market is very dull with consumers showing limited interest. Prices moved up slightly.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Sept. 1	Sept. 2	Sept. 3	Sept. 4	Sept. 6	Sept. 7
Copper, electro, Conn.	30.00	30.00	30.00	30.00	....	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	....	30.00
Tin, Straits, New York	92.50	92.875	92.625	....	....	92.75*
Zinc, East St. Louis	11.00	11.00	11.50	11.50	....	11.50
Lead, St. Louis	14.05	14.05	14.05	14.05	....	14.05

Note: Quotations are going prices **Tentative*

The latest processing and production equipment for the food, chemical and petroleum industries is made of stainless steel. Practically unaffected by the corrosive action to which it is constantly subjected, this new equipment helps keep production costs down, greatly facilitates quality control.

Automotive applications for stainless steels become more numerous with each year's new-model cars and trucks. Today they include such diverse items as exhaust valves and door handles, water pump shafts and radiator grilles, decorative trim and truck bodies.

Lighter, more durable railroad cars are made possible by structural members and side paneling of strong, corrosion-resistant stainless steel. In both freight and passenger service, these cars are cutting railroad operating and maintenance costs, increasing the speed, safety and comfort of rail travel.

Why so many are saying...

MAKE IT STAINLESS

Manufacturers of everything from can openers and hub caps to railroad cars and jet engines are now saying, more and more frequently, "*make it stainless.*"

Virtually indestructible by corrosive action, stainless steels defy the effects of air, water, foods, fumes and chemicals. They can be machined, formed and fabricated; their surfaces can be polished satin-smooth or mirror-bright. There are grades of stainless available to meet a wide range of mechanical and heat-resistant requirements.

Stainless steels are cutting production costs, improving product performance and appearance, increasing customer acceptance in an ever-growing number of applications. For complete information in regard to your own application, contact your supplier.

The finest stainless steels are made with Vancoram ferrochromium, ferrochrome-silicon and ferro titanium.

Architectural components of stainless steel range from screws, nails and decorative trim to roofing, curtain walls and theater marquees. Strong and corrosion resistant, they cut construction and maintenance costs, yet increase beauty and efficiency, in all types of modern buildings.

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.

DETROIT • CHICAGO • PITTSBURGH • CLEVELAND

VANCORAM BRAND

Nonferrous Prices

(Effective Sept. 7, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb. f.o.b. ship. pt., frt. allowed)

Flat Sheet: 0.136-0.249 in., 2S, 3S, 34.9¢; 4S, 37.1¢; 52S, 39.2¢; 24S-O, 24S-OAL, 38.3¢; 75 S-O, 75S-OAL, 45.8¢; 0.081 in., 2S, 3S, 36.1¢; 4S, 38.8¢; 52S, 40.9¢; 24S-O, 24S-OAL, 39.8¢; 75S-O, 75S-OAL, 48.1¢; 0.032 in., 2S, 3S, 38.1¢; 4S, 43.0¢; 52S, 45.7¢; 24S-O, 24S-OAL, 48.4¢; 75S-O, 75S-OAL, 59.8¢.

Plate, ¼-in. and heavier: 2S-F, 3S-F, 33.6¢; 4S-F, 35.7¢; 52S-F, 37.4¢; 61S-O, 36.8¢; 24S-O, 24S-OAL, 38.4¢; 75S, 75S-OAL, 45.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.7¢ to 85.7¢; 12 to 14, 38.4¢ to $1.03; 24 to 26, 41.2¢ to $1.34; 36 to 38, 48.8¢ to $1.96.

Rod, Round: Rolled, 1.064-4.5 in., 2S-F, 42.6¢ to 39.1¢; cold finished, 0.375-3.499 in., 2S-F, 46.9¢ to 41.4¢.

Screw Machine Stock: Rounds, 11S-T3, 1/8-11/32 in., 62.5¢ to 49.1¢; ⅜-1½ in., 48.9¢ to 45.9¢; 1 9/16-3 in., 44.7¢ to 41.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 2S, 46.1¢ to 34.8¢; 52S, 55.7¢ to 43.4¢; 17S-T4, 63.3¢ to 43.7¢; 61S-T4, 58.5¢ to 43.1¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼-2 in., 43.4¢ to 63.8¢; 2-4 in., 39.3¢ to 53.6¢; 4-6 in., 39.8¢ to 48.8¢; 6-9 in., 40.4¢ to 51.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in. 42¾ x 60-in., $2.918; x 96-in., $4.672; x 120-in., $5.841; x 144-in., $7.009. Coiled sheet, per lb, 0.019 in. x 28 in., 29.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.33	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	....
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	....	62.63

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.68
Rod, bar, wire	1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	22.20
Aluminum pig	20.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	14.05
Lead, New York	14.25
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
ingot	27.75
Magnesium, sticks, 100 to 500 lb,	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$298 to $300
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$21.00
Platinum, dollars per troy oz.	$84 to $87
Silver, New York, cents per troy oz.	85.25
Tin, New York	92.75
Titanium, sponge, grade A-1	$4.72
Zinc, East St. Louis	11.50
Zinc, New York	12.00
Zirconium copper, 50 pct.	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	27.00-28.50
No. 120	26.25-27.75
No. 123	25.75-27.25
80-10-10 ingot	
No. 305	31.50-33.00
No. 315	29.25-30.75
88-10-2 ingot	
No. 210	41.25-41.75
No. 215	37.75-38.25
No. 245	33.25-33.75
Yellow ingot	
No. 405	23.25-24.25
Manganese bronze	
No. 421	26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.50-23.75
0.60 copper, max.	23.25-23.50
Piston alloys (No. 122 type)	20.50-21.75
No. 12 alum. (No. 2 grade)	19.75-20.25
108 alloy	20.50-20.75
195 alloy	20.50-22.00
13 alloy (0.60 copper max.)	23.25-23.50
ASX-679	20.50-20.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	21.00-21.50
Grade 2—92-95%	20.00-20.50
Grade 3—90-92%	19.00-19.50
Grade 4—85-90%	18.00-18.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	42.64
Electrodeposited	41.88
Flat rolled	45.04
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	23⅛
Mang. bronze	18¼	17½
Yellow brass rod ends	19½	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27 —27¼
No. 2 copper wire	25½—25¾
Light copper	24 —24¼
*Refinery brass	23 —24

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¾—27
No. 2 copper wire	25¼—25½
Light copper	23¾—24
No. 1 composition	21½—22
No. 1 comp. turnings	20½—21
Rolled brass	17½—18
Brass pipe	18½—19
Radiators	17¾—18¼
Aluminum	
Mixed old cast	13¼—13¾
Mixed new clips	14 —14¼
Mixed turnings, dry	13½—14
Pots and pans	13¼—13¾

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	24½—25
No. 2 heavy copper and wire	23 —23¼
Light copper	21 —21½
New type shell cuttings	20¾
Auto radiators (unsweated)	18
No. 1 composition	19 —19½
No. 1 composition turnings	18½—19
Unlined red car boxes	16
Cocks and faucets	16 —16½
Mixed heavy yellow brass	13
Old rolled brass	15¼
Brass pipe	16½—17
New soft brass clippings	18
Brass rod ends	16
No. 1 brass rod turnings	15
Aluminum	
Alum. pistons and struts	7 — 8
Aluminum crankcases	10
2S aluminum clippings	13
Old sheet and utensils	10
Borings and turnings	6
Misc. cast aluminum	10
Dural clips (24S)	11
Zinc	
New zinc clippings	6 — 6½
Old zinc	4¾— 5
Zinc routings	3 — 3½
Old die cast scrap	3 — 3¼
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	40
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel clippings	23 —25
Clean Monel turnings	16 —18
Old sheet Monel	21 —23
Nickel silver clippings, mixed	15
Nickel silver turnings, mixed	13
Lead	
Soft scrap lead	11¼—11½
Battery plates (dry)	6 — 6¼
Batteries, acid free	4½
Magnesium	
Segregated solids	18½—19
Castings	17½—18
Miscellaneous	
Block tin	75 —80
No. 1 pewter	55 —60
No. 1 auto babbitt	48
Mixed common babbitt	12 —12½
Solder joints	16¾
Siphon tops	45
Small foundry type	15½
Monotype	14½
Lino. and stereotype	12¾
Electrotype	11½
Hand picked type shells	8½
Lino. and stereo. dross	5½
Electro dross	4¼

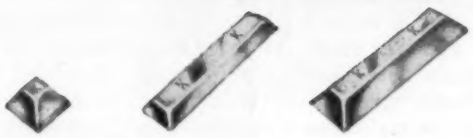
SITUATION UNDER CONTROL — BY KEOKUK

KEOKUK
CHIEF KEOKUK:
"Little Chief say old way get smoke signals crossed He cut letters in blankets!"
PRINCESS WENATCHEE:
"As usual he has the situation well under control!"
dickstone

KEOKUK ELECTRO-METAL COMPANY

KEOKUK, IOWA

WENATCHEE DIVISION, WENATCHEE, WASHINGTON



Keokuk Silvery . . . the superior form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

Smoke out high costs and control quality with Keokuk Silvery Pig Iron! Keokuk assures less waste and exact control of the melt through uniform silicon distribution. Car for car, pig for pig, its uniformity *never* varies. Charge Keokuk by magnet or count.

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

Scrap Tightens, Prices Rise

Scarcity of No. 1 steelmaking grades brings higher prices in several areas . . . Composite hits $29 . . . Lower manufacturing cuts generation . . . Export impact spreading inland.

Scrap price rises in several districts this week bore out frequent predictions that mills would have to pay more for increased tonnages. And many in the trade believe that the market may continue very firm for some weeks.

Most recent price increases were not occasioned by any startling increase in steelmaking. Rather, they reflected tighter supplies, particularly on No. 1 steelmaking grades. Depressed steelmaking and metalworking operations have caused the flow of home and industrial scrap to dwindle. And thriving export business on both coasts has seriously affected flow of metallics inland—in the East as far as Birmingham and Pittsburgh.

As these areas reach out for scrap, impact of exports will be felt even farther away from salt water. In addition, steelmaking is expected to pick up, although at a moderate rate.

THE IRON AGE Steel Scrap Composite Price rose 33¢ this week to $29.00 per gross ton.

Pittsburgh . . . No. 1 heavy melting steel is up $1 per ton to $31, top, on basis of a sale to a leading consumer. No. 2 steel and No. 2 bundles moved up to $28 and $25, respectively, on the same deal. The mill paid $1 less for No. 2 steel and No. 2 bundles for a second consuming point. But some brokers already are forfeiting their usual commission in order to fill their orders so the higher price prevails. Material is not so plentiful in the district and it's impossible to bring anything in from other areas at even the higher price. A mill on the fringe of the district reportedly paid $32 and $29, respectively, for No. 1 and No. 2 steel but higher freight is a factor. Latest price for factory bundles in the district is approximately $33 F. O. B., making the delivered price nearly $36 to the mill that bought them.

Chicago . . . The local market continues with virtually no changes in prices for another week. With broker buying continuing in a small quantity and consumer activity very low, prices continue to hold present levels. Two factors can be behind the long lasting stability. Despite low activity, there is not any great accumulation of scrap in dealer yards. Quantity is low enough to suggest that any major mill buying would force the price up. With that in mind, a number of producers and sellers feel that scrap in hand is money in the bank, are willing to deal in small volume at present.

Philadelphia . . . As yet there is no sign of the market strengthening that cropped up in other areas. Export demand is still firm, but local mills continue to hold off. Some trade sources do not expect any important local mill buying in the near future unless there is a sudden pick-up in steel orders.

New York . . . Export business continues to thrive here. Dealers and brokers are watching prices rise in other areas, hope it will spread here when domestic mills reach into this area for scrap. Meanwhile tightening supplies of No. 1 material gave rise to predictions of broker competition to cover export orders. Many in the trade feel prices will go up from this cause alone in the near future, expect a real scarcity of quality material if exports continue.

Detroit . . . Most steelmaking and blast furnace grades looked at least $1 better on the basis of substantial orders from the area's two biggest consumers. However, prices offered for orders going out of the district were somewhat lower than for scrap staying at home. Dealers here have not been collecting much scrap in recent weeks, resulting in resistance to lower prices. While not much hope is held for increases, the feeling here is that the market has reached a comparatively stabilized level.

Cleveland . . . Cleveland and Valley market was showing increased strength last week although actual sales were still spotty. Mill buyers are looking but are reluctant to pay dealers' asking prices. Youngstown top price for No. 1 heavy melting went up $1 on basis of some sales. Some electric furnace grades were commanding up to $1 premium because of low phos requirements although listed as No. 1 heavy melting. Cleveland prices were unchanged but feeling pressure from the Valley.

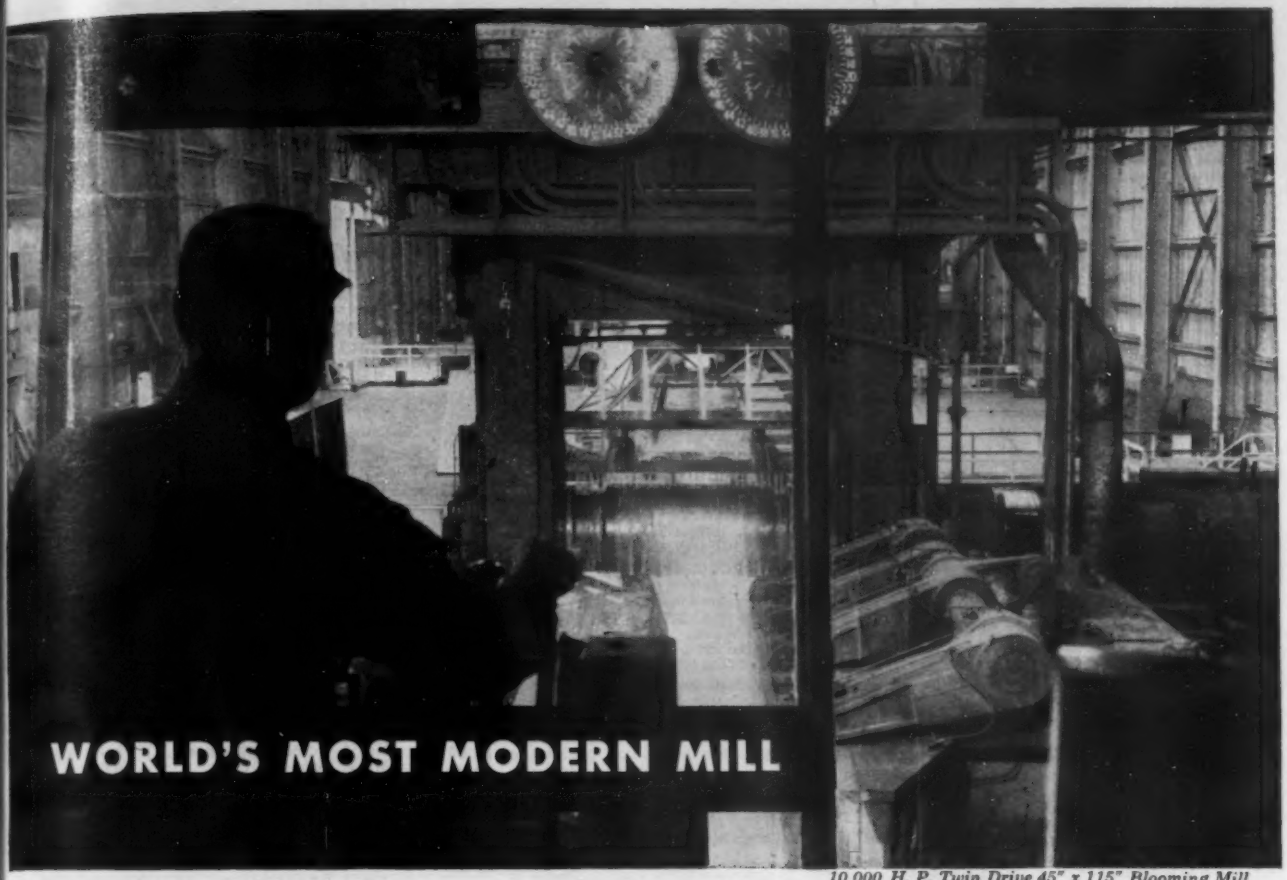
Birmingham . . . No. 1 cast, which has held doggedly to a $44.50 top delivered in Birmingham despite a scarcity that necessitated imports from other areas, this week advanced 50¢. And the biggest buyer of openhearth scrap in the district went back into the market boosting prices of some grades. No. 2 bundles, which have been hard to sell, were again being purchased in limited quantities, primarily due to shortages caused by export buying and more steelmaking.

St. Louis . . . List of the St. Louis Southwestern Ry. of approximately 1000 tons including a widely scattered variety of items which closed this week brought about the same prices as previously. Steel mills have been buying only nearby small tonnages as offered and not much buying is expected until after Sept. 15.

Cincinnati . . . Area mill buying for September will be slightly lower tonnage than August for one mill and little if any buying for a second. Overall market continues weak. Industrial lists a week ago were rather spotty but on some grades were up to $1 over previous lists.

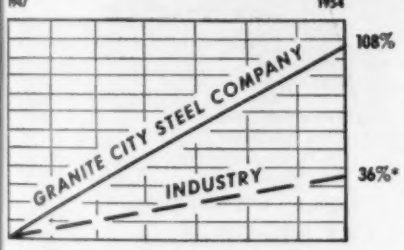
Boston . . . The market here is very quiet. Little scrap is moving, and no one expects much change in the immediate future. Prices are holding at last week's levels.

West Coast . . . No change in mill requirements for September. Demand and prices holding same level. Continuing strike in one small San Francisco mill weakening market somewhat. No export activities at present, but a small tonnage (half cargo) is slated to be loaded for Japan about mid-month. Balance of this ship scheduled to be made up in Los Angeles. Slight fall-off in cast demand as a result of Labor Day holiday. Pipe foundries keeping cast demand up; gray iron foundries in fairly good shape with 1 to 2 weeks work backlog.



10,000 H. P. Twin Drive 45" x 115" Blooming Mill

Four reasons why Granite City Steel is growing 3 times faster than the industry!



Percentage increase in steel ingot capacity

**Computed from AISI figures.*

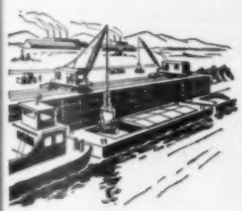
From 1947 to 1954, ingot capacity of the average U. S. steel mill increased 36%*. During the same period, ingot capacity of Granite City Steel Company expanded 108% — from 620,000 to 1,290,000 tons a year—or three times faster than the industry average!

Why? Because the demand for Granite City sheet steel dictated one of the most ambitious plant modernization and expansion programs ever undertaken. An $89 million investment went into blast furnaces, additional coke ovens, new open hearth furnaces . . . a new blooming mill, a new roughing mill . . . sharply stepped-up hot strip mill capacity . . . a new hot rolled shear line, a new cold strip mill.

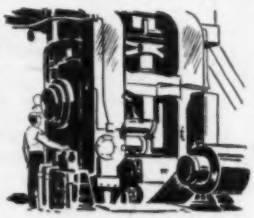
Result: the world's most modern, fully integrated mill, specializing in high quality flat-rolled steel for Middle America.

What does this growth mean to you? Fast, complete service and personal attention to every order, large or small. Granite City is equipped and eager to serve *you*. May we discuss the steel needs in your business, today?

AND HERE ARE THE OTHER THREE REASONS . . .



Low-cost transportation. Granite City Steel Company is strategically located in the heart of Middle America. Rail, truck and water transportation are available for quick, efficient, economical shipping.



Specialized "know how." For 76 years, flat-rolled steel has been the only product of Granite City Steel Company. This specialization—in training, personnel, equipment—is your guarantee of finest sheet steel available.

Personalized service. Granite City steelmen do not have the manufacturing and sales problems of a large, diversified line of products. This gives them more time to expedite your flat-rolled steel order promptly, properly.

GRANITE CITY STEEL CO.
GRANITE CITY, ILLINOIS
Sales Offices: St. Louis • Kansas City • Memphis • Minneapolis
Dallas • Houston • Tulsa
GRANITE CITY STEEL
GRANCO STEEL PRODUCTS CO.
A subsidiary of Granite City Steel Co.

Scrap Prices

(Effective Sept. 7, 1954)

Pittsburgh

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.50 to 16.50
Mixed bor. and ms. turns.	15.50 to 16.50
Shoveling turnings	19.50 to 20.50
Cast iron borings	19.00 to 20.00
Low phos. punch'gs, plate	33.00 to 34.00
Heavy turnings	27.00 to 28.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	30.00 to 31.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 1 dealers' bundles	29.00 to 30.00
No. 2 dealers' bundles	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	34.00 to 35.00
Low phos. punch'gs, plate	32.00 to 33.00
Low phos. 3 ft and under	32.00 to 33.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	36.00 to 38.00
Rerolling rails	44.00 to 45.00
Rails 2 ft and under	44.00 to 45.00
Locomotive tires, cut	33.00 to 34.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	37.00 to 38.00
RR. steel car axles	40.00 to 41.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	39.00 to 40.00
Cupola cast	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	33.00 to 34.00
Malleable	40.00 to 41.00
Stove plate	29.00 to 30.00

Philadelphia Area

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 bundles	26.50 to 27.50
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Shoveling turnings	17.00 to 18.00
Clean cast chem. borings	20.00 to 21.00
Low phos. 5 ft and under	28.00 to 29.00
Los phos. 2 ft and under	29.00 to 30.00
Low phos. punch'gs	29.00 to 30.00
Elec. furnace bundles	27.50 to 28.50
Heavy turnings	24.00 to 25.00
RR steel wheels	31.50 to 32.50
RR. spring steel	31.50 to 32.50
Rails 18 in. and under	41.00 to 42.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron carwheels	38.00 to 39.00
Malleable	36.00 to 37.00
Unstripped motor blocks.	27.00 to 28.00
No. 1 machinery cast.	40.00 to 41.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut struct'r'l & plate, 2 ft & under	31.50 to 33.00
Drop forge flashings	26.00 to 27.00
Low phos. 2 ft & under	30.00 to 31.00
No. 1 RR heavy melting	29.00 to 30.00
Rails 3 ft and under	43.50 to 44.00
Rails 18 in. and under	44.50 to 45.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	42.00 to 43.00
No. 1 machinery cast.	41.00 to 42.00
Stove plate	34.00 to 35.00
Malleable	40.00 to 41.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. plate	31.00 to 32.00

Buffalo

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	26.00 to 27.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.50 to 15.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	18.00 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	29.00 to 30.00
Scrap rails, random lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 cupola cast.	34.00 to 35.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles, openhearth	24.00 to 25.00
No. 2 bundles	16.00 to 17.00
New busheling	22.00 to 23.00
Drop forge flashings	22.00 to 23.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Low phos. punch'gs, plate	22.00 to 23.00
No. 1 cupola cast.	32.00
Heavy breakable cast.	23.00
Stove plate	28.00
Automotive cast.	36.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	12.50 to 13.00
Cast iron borings	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
No. 1 RR. hvy. melting	32.50 to 33.50
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	42.00 to 43.00
Locomotive tires, uncut	31.00 to 32.00
Angles and splice bars	34.00 to 35.00
Std. steel car axles	35.00 to 36.00
RR. spring steel	31.00 to 32.00
Cupola cast	41.00 to 42.00
Hvy. breakable cast	30.00 to 31.00
Cast iron brake shoes	26.00 to 27.00
Stove plate	35.00 to 36.00
Cast iron car wheels	32.00 to 33.00
Malleable	35.00 to 36.00
Unstripped motor blocks.	30.00 to 31.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$20.50 to $21.50
No. 2 hvy. melting	17.50 to 18.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings	14.00 to 15.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	22.50
No. 1 bundles	23.50
No. 2 bundles	17.00 to 18.00
No. 1 busheling	23.50
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	27.00 to 28.00
Bar crops and plate	30.50 to 31.50
Structural and plate, 2 ft.	30.50 to 31.50
No. 1 RR. hvy. melting	27.00 to 28.00
Scrap rails, random lgth.	34.00 to 45.00
Rails, 18 in. and under	38.00 to 39.00
Angles & splice bars	35.00 to 36.00
Rerolling rails	39.50 to 40.00
No. 1 cupola cast.	44.00 to 45.00
Stove plate	40.50 to 41.50
Charging box cast.	19.00 to 20.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks.	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	12.00 to 13.00
No. 1 bundles	18.00 to 19.00
No. 2 bundles	11.50 to 12.50
No. 1 busheling	18.00 to 19.00
Elec. furnace, 3 ft & under	18.00 to 19.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and short turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	10.00 to 11.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	25.00 to 25.50
Stove plate	25.00 to 26.00
Unstripped motor blocks.	15.50 to 16.50

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.50 to $26.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 bundles	26.00 to 27.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Low phos., 18 in. & under	32.00 to 33.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	43.00 to 44.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	43.00 to 44.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	8.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$42.00 to 45.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	$15.50 to 16.00
No. 3 bundles	12.00
Machine shop turn.	9.00
Shoveling turnings	7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under.	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	42.00 to 43.00

Seattle

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	21.00
No. 1 bundles	21.50
No. 2 bundles	17.00
No. 3 bundles	13.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd	20.00
Bush., new fact unprep'd	16.00
Short steel turnings	12.00
Mixed bor. and turn.	13.00
Rails, remelting	31.00
Cast scrap	$42.00 to 45.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Exports-Imports—Livingston & Southard, Inc., 99 Park Avenue, New York, N. Y. Cable Address: FORENTRACO.

Comparison of Prices

(Effective Sept. 7, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 7 1954	Aug. 31 1954	Aug. 10 1954	Sept. 8 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.82	5.82	5.82	5.575
Plate	4.237	4.237	4.237	4.10
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.312¢	4.312¢	4.312¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.801¢	4.801¢	4.801¢	4.634¢

	Sept. 7 1954	Aug. 31 1954	Aug. 10 1954	Sept. 8 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$62.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd. Philadelphia	60.27	60.27	60.27	61.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	10.00¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.76
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$30.50	$29.50	$29.50	$41.50
No. 1 steel, Phila. area	27.00	27.00	24.50	38.50
No. 1 steel, Chicago	29.50	29.50	29.50	38.00
No. 1 bundles, Detroit	24.50	23.50	23.50	36.50
Low phos., Youngstown	31.50	31.50	33.00	46.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	47.50
No. 1 mach'y cast, Philadel'a.	40.50	40.50	39.50	44.50
No. 1 mach'y cast, Chicago	39.50	39.50	39.50	39.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$29.00	$28.67	$27.83	$38.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	16.75	16.75	16.75	17.25

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.50‡
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	92.75†	92.50*	95.00	82.75
Zinc, East St. Louis	11.50	11.00	11.00	10.50
Lead, St. Louis	14.05	14.05	13.80	13.80
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 195→

Producing Point	Basic	Fdry.	Mall	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.00	58.40	58.00	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct); 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1* $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.a.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75–63.00	50.50–50.75	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4.*

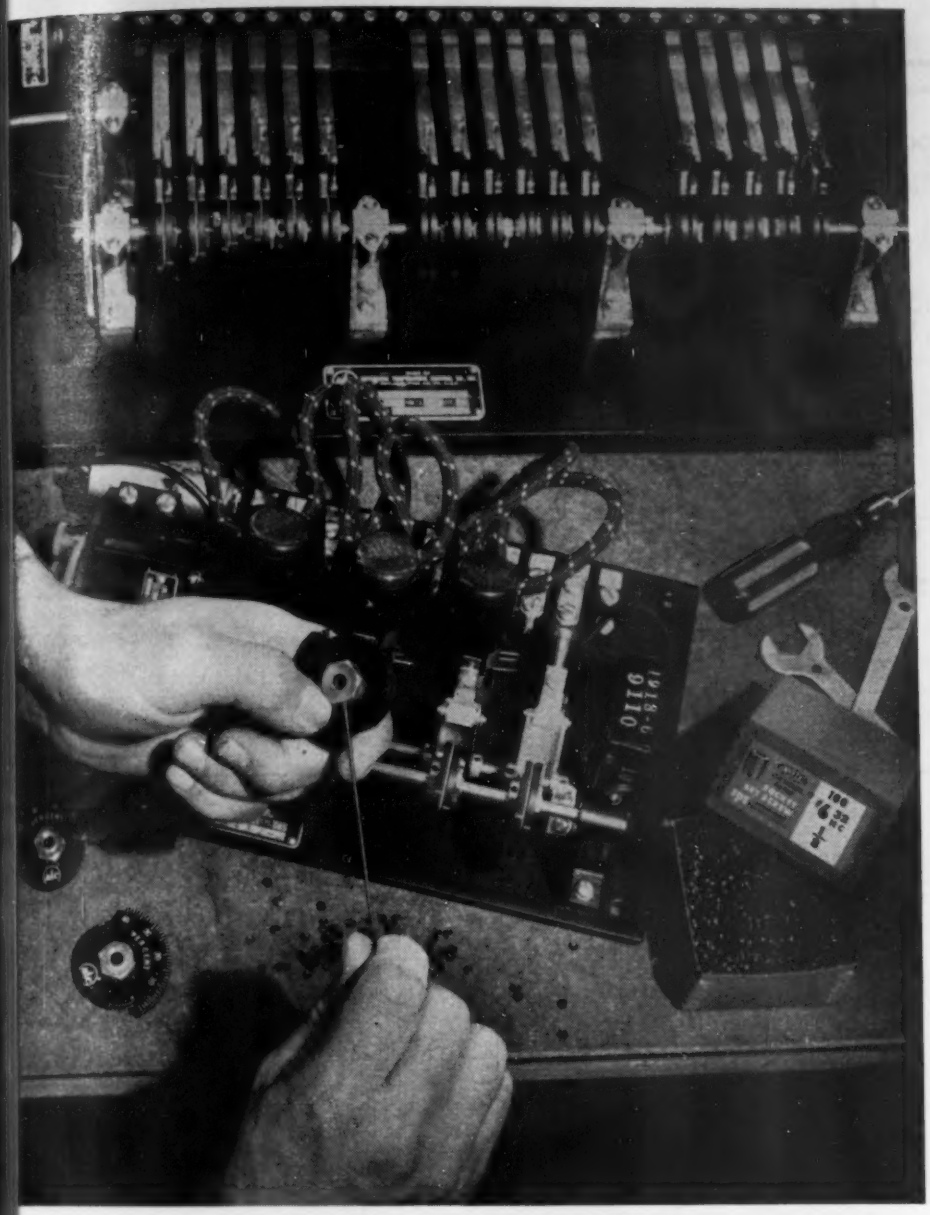
Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11*

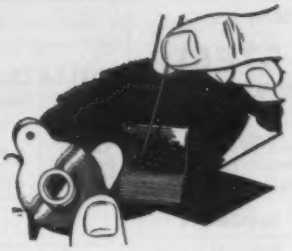
Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, nd., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massill n Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*



Two UNBRAKO **Self-Locking Socket Set Screws** are used on each cam of these precision multicircuit cam timers. The screws position the cams so as to control accurately the sequence and duration of one or a series of individually timed machine or process operations.



Assembler picks up tiny UNBRAKO set screw with long arm key preparatory to threading it into cam assembly.

He inserts the UNBRAKO, and turns it into the assembly; then after positioning cam, tightens it. The accurate depth and size of the hex socket result in maximum torquing—the knurled cup point holds the cam accurately in place.

UNBRAKOS—made of heat treated alloy steel—have fully formed threads, Class 3 fit; are supplied in standard sizes from #4 to 1".

You'll need less space for storage when you use UNBRAKO Standards—stocked by your distributor

You'll need less space for storage and be able to carry a smaller inventory, because standard UNBRAKO socket screw products are in stock at your local industrial distributor's. And you'll save time and money, because deliveries are prompt. For more information, write for UNBRAKO Standards—a complete listing of socket screw products made by the world's largest manufacturer of these precision fasteners. STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

UNBRAKO® SOCKET SCREW DIVISION

SPS JENKINTOWN PENNSYLVANIA

Flat Head Cap Screw · Shoulder Screw · Knurled Head Cap Screw · Dowel Pin · Button Head Socket Screw

IRON AGE

STEEL PRICES

(Effective Sept. 7, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B3,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.175 *A2*		6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Harrison, N. J.													
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		3.95 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Wallingford, Conn.									6.20 *W1*				
	Worcester, Mass. Pawtucket, R. I.									6.30 *N7* 6.60 *A5*				12.75 *A* 12.80 *Y*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$88.00 *R3*	$82.00 *T5* $86.00 *R3*										12.60
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4, W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.6
	Detroit, Mich.			$88.00 *R5*					4.20 *G3,M2*	5.90 *D1,D2, G3,M2,P11*	6.30 *G3*	8.35 *D2* 8.75 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	6.00 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C3*				
	Newport, Ky.												6.70 *N5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1,R3*	6.70 *S1*	12.45 *S*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *S7,P6*	5.75 *B4,J3 S7*			6.70 *S9*	12.45 *S*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3, W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.65 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.85 *S2*	7.00 *S2*		4.65 *S2*				7.30 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *T2,C16* 4.28 *R3*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$85.00 *S2*	$93.00 *S2*		4.65 *S2*	6.85 *S2*		4.45 *S2*				7.10 *S2*	

STEEL PRICES

(Effective Sept. 7, 1954)

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	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
	Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
Bethlehem, Pa.													
Buffalo, N. Y.	4.95 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*			
Claymont, Del.													
Coatesville, Pa.													
Conshohocken, Pa.	4.10 *A2*					6.10 *A2*							
Harrisburg, Pa.													
Hartford, Conn.													
Johnstown, Pa.										4.675 *B3*			
Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.80 *U1*	$7.50 *U1*	
New Haven, Conn.													
Phoenixville, Pa.													
Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.80 *B3*	$7.50 *B3*	
Worcester, Mass.										4.975 *A5*			
Trenton, N. J.													
Alton, Ill.										4.85 *L1*			
Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4,R3*			
Sterling, Ill.										4.775 *N4*			
Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
Detroit, Mich.	4.20 *G3, M2*	5.10 *G3*				6.25 *G3*	7.65 *G3*						
Newport, Ky.	4.05 *N5*		5.45 *N5*										
Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1,I3, Y1*	7.50 *U1,Y1*			4.675 *Y1*	$8.70 *I3, U1,Y1*	$7.40 *I3, U1,Y1*	6.10 *U1, Y1*
Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.69 *G2*	6.30 *G2*
Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
Niles, Ohio	4.05 *S1,R3*	4.95 *R3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1,R3*	7.50 *R3*				$3.70 *R3*	$7.40 *R3*	
Sharon, Pa.	5.30 *N3*	5.975 *N3*											
Pittsburgh, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*
Midland, Pa.													
Butler, Pa.													
Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*
Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
Geneva, Utah	4.15 *C7*					6.45 *C7*							
Kansas City, Mo.													
Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
Minnequa, Colo.										4.925 *C6*			
San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.45 *C7*	$8.15 *C7*	
Seattle, Wash.													
Atlanta, Ga.													
Fairfield, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.80 *T2*	$7.50 *T2*	
Alabama City, Ala.													
Houston, Texas	4.45 *S2*									5.075 *S2*			

† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box.

* COKES: 1.50 lb add 25¢.

ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢; 1.00-lb add $1.20.

IRON AGE

STEEL PRICES

(Effective Sept. 7, 1954)

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'n. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3* 4.33 *R3*	4.30 *B3* 4.33 *R3*	5.45 *B5*	5.075 *B3* 5.105 *R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*		
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							3.975 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Putnam, Conn.			5.95 *W10*								
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.55 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5* 7.075 *B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.46 *R3*		5.40 *R2* 5.44 *R3*	4.875 *T5* 5.115 *R3*	6.375 *T5* 6.625 *R2* 6.665 *R3*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8* 4.37 *R3*	4.30 *N4* 4.37 *R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1, W8* 5.145 *R3*	6.625 *A5,W8, W10,L2, B5*		4.225 *U1,W8, I3,A1*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W*
	Cleveland, Ohio	4.36 *R3*	4.36 *R3*	5.40 *A5,C13*		6.625 *A5* 6.665 *C13*	6.45 *R3*	4.225 *J3* 4.285 *R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.45 *R5,G3*		5.55 *R5* 5.60 *B5,P8* 5.65 *P3*	5.175 *R5* 5.225 *G3*	6.725 *R5* 6.825 *B5,P3, P8*	6.60 *G3*	4.375 *G3*			6.60 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5* 5.47 *R3*	5.075 *I3, U1, Y1*	6.525 *M5* 6.695 *R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.34 *R3*					6.45 *R3*	4.225 *S1*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *I3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8,C11 J3,W10,B4* 5.46 *R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8* 6.685 *R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1,Y1,C10* 4.35 *R3*	4.30 *U1,Y1* 4.35 *R3*	5.40 *F2,Y1, C10*	5.075 *U1,Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1,Y1*	4.225 *U1,Y1*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.675 *S2*		7.05 *S2*					6.35 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				5.90 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16* 4.33 *R3*	4.30 *T2,C16* 4.33 *R3*				6.45 *T2*	4.225 *T2* 4.255 *R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.70 *S2*	4.70 *S2*		5.475 *S2*		6.85 *S2*	4.40 *L3* 4.625 *S2*		6.20 *S2*	6.85 *S2*	6.25 *S2*

Steel Prices

(Effective Sept. 7, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Drives Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
*W9** Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers' discount, 5 pct.
Galvanized discounts based on zinc price in range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price in range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

Steel Prices

(Effective Sept. 7, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425				
So. Chicago *R3*				7.30			
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.85	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P5*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.80		5.425	11.50
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R3*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*33.20	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	38.30	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	46.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	[illegible].70	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146	...	155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149			156	6.90	7.425
Atlanta *A8*	139	151	...	157	164	7.00	7.525
Bartonville *K2*	139	151	...	157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	149	...	155	162	6.90	7.45
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151	...	157	159	7.00	7.55
Donora, Pa. *A5*	137	146	...	155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146	...	155	159	6.90	7.30
Galveston *D4*	139						
Houston *S2*	145	154			167	7.30	7.70
Johnstown, Pa. *B3*	137	149			162	6.90	7.45
Joliet, Ill. *A5*	137	146	...	155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148	...	157	161	7.00	7.55
Los Angeles *B2*						7.85	
Kansas City *S2*	148	158		167	171	7.50	7.90
Minnequa *C6*	142	156	150	160	168	7.15	7.55
Monessen *P6*	137	151			163	6.90	7.45
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	156	169	...	179	179	7.85	8.25
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	146			159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139			157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143					7.20	
Williamsport, Pa. *S5*			150				

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As Rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As Rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.22	7.51	7.78	6.89	.....	6.57	6.92	6.88	8.52	.....	.....	.....	.....
Birmingham	.15	6.35–6.50	7.35–8.10	8.25–9.00	6.60	9.60	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston	.10	7.23	8.23	9.42–9.52	7.47	9.65–9.85	7.34–7.37	7.49	7.20	8.60–8.70	12.60–12.80	12.45–12.46	15.15	15.10
Buffalo	.20	6.35–6.40	7.40[3]–7.45	8.80–8.84	6.70–6.75	.....	6.65–6.70	6.70–6.77	6.50–6.55	7.85[3]–7.90	12.50	12.15[3]	14.85	14.75–14.80[3]
Chicago	.20	6.38	7.38	8.30	6.62	.....	6.52	6.69	6.51	7.50	12.25	11.90	14.60	14.55
Cincinnati	.15	6.49–6.53	7.37–7.42	8.25–8.30	6.86–6.91	.....	6.81–6.86	6.91	6.75–6.80	7.80–7.85	12.55	12.15–12.20	14.90	14.80–14.85
Cleveland	.20	6.38	7.38	8.45	6.72	.....	6.69	7.02	6.57	7.60	11.94	.....	.....	14.61
Denver		7.85	8.85	10.02	8.20	.....	7.95	7.95	8.05	9.05	.....	.....	.....	.....
Detroit	.20	6.57	7.57	8.50–8.58	6.90	.....	6.80–6.85	7.16	6.79	7.77	12.45	12.10	14.80	14.75
Houston	.20	7.35	7.65–7.80	9.93	7.70	.....	7.35	7.60	7.70	9.50–9.60	.....	13.10	.....	.....
Kansas City	.20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07–8.27	.....	12.27	.....	.....
Los Angeles	.20	7.40	9.25	9.55–9.85	7.75	.....	7.35	7.55	7.35–7.45	10.05	.....	13.20	.....	16.35
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21–8.39	6.71	.....	6.61	6.86	6.60	7.69	12.34	11.99	14.69	14.64–14.84
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90–6.95	7.05	6.80	8.70–10.70	.....	.....	.....	.....
New York	.10	6.97–6.98	7.78–8.46	8.79[1]–8.99	7.36–7.56	.....	7.18–7.27	7.13–7.38	7.30–7.37	8.63–8.73[2]	12.63	12.28	.....	14.93
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.29[3]	8.09[4]–8.23	6.96	.....	6.49	6.54	6.74	8.19[3]	.....	11.66–11.96[3]	.....	14.61[3]
Pittsburgh	.20	6.38	7.38	8.30–8.50	6.72–6.75	.....	6.52	6.69	6.51	7.85	12.25	11.90	14.60	14.55
Portland	.20	7.60	8.75	9.05	7.85	.....	7.45	7.50	7.55	10.95	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70–8.85	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.35–9.85	7.80	.....	7.40	7.50	7.35	10.05	.....	13.20	.....	16.35
Seattle	.00	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.65	.....	16.30
St. Louis	.20	6.62–6.67	7.67	8.54–8.59	6.91	.....	6.81	7.09	6.80	7.89	12.54	12.19	14.84–14.89	14.45–14.84
St. Paul	.15	7.03	8.03–8.58	8.96	7.28	.....	7.19	7.35	7.16	8.26	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.90	8.25	9.20	10.95	.....
Detroit *D2*	5.90	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	5.75	8.05	9.00	10.95	.....
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	10.95	13.25
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.75	8.05	9.00	10.95	.....

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

Miscellaneous Prices

(Effective Sept. 7, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium ..... .73
Oil hardened manganese ..... .405
Special carbon ..... .37
Extra carbon ..... .31
Regular carbon ..... .26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y...	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50

4-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less .....$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
6	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Stove Bolts

Packaged, package list ..... 44½—10
Bulk bulk list* 59

*Minimum quantity per item: 15,000 pieces lengths to 3"; 5,000 pieces lengths over 3". Special finishes: Zinc, Parkerized, cadmium or nickel add 6¢ per lb net. Black oil finish add 2¢ per lb net.

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1¼" inclusive	58	66
1⅜" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes 55 64

Hot Galv. Nuts (all types)

¾" or smaller 38 50
⅞" to 1½" inclusive ... 41 52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes 55 66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* ⅝" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item: 15,000 pieces ¼", 5/16", ⅜" diam. 5,000 pieces 7/16", ½", 9/16", ⅝" diam. 2,000 pieces ¾", ⅞", 1" diam.

Machine Screws

	Discount
Packaged, gross list	44½—10
Bulk, bulk list*	17

*Minimum bulk quantity, 15,000 pieces per item.

Machine Screw & Stove Bolt Nuts

Packaged, package list ..... 36—10
Bulk, bulk list* 17

*Minimum bulk quantity, 15,000 pieces per item.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00) .. $114.00
No. 1 Ohio 107.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 107.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $120.00
Childs, Hays, Pa. 125.00
Chicago District 130.00
Western Utah ....
California ....
Super Duty
Hays, Pa., Athens, Tex., Windham 137.00
Curtner, Calif. 155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 20.00
Silica cement, net ton, bulk, Hays, Pa. 22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 21.00
Silica cement, net ton, bulk, Utah and Calif. ....

Chrome Brick

Per net ton

Standard chemically bonded Balt.. $86.00
Standard chemically bonded, Curtner, Calif. 96.25
Burned, Balt. 80.00

Magnesite Brick

Standard Baltimore $109.00
Chemically bonded, Baltimore 97.50

Grain Magnesite

St. ⅜-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed $64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 38.00
in sacks 43.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $14.50
Midwest 14.60
Missouri Valley 13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; effective CaF_2 content
72½% $44.00
70% or more 42.50
60% or less 38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags ... 11.25¢
Canadian sponge iron,
Del'd in East ..... 12.0¢
F.o.b. ship. pt., carloads... 9.5¢
Domestic sponge iron, 98+% Fe, carload lots ..... 18.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe .. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe.. 83.0¢ to $1.48
Aluminum ..... $1.5¢
Brass, 10 ton lots ..... 29.50¢ to 36.50¢
Copper, electrolytic ..... 43.50¢
Copper, reduced ..... 43.50¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd... $3.60
Lead ..... 21.00¢
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 89.50¢
Nickel, annealed ..... 96.50¢
Nickel, spherical, unannealed 93.50¢
Silicon ..... 43.50¢
Solder powder.. 7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 91.0¢
Stainless steel, 316 ..... $1.10
Tin ..... 14.04¢ plus metal value
Tungsten, 99% (65 mesh) .. $4.05
Zinc, 10 ton lots ..... 17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Sept. 7, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C	36.00	0.15% C	33.75
0.025% C, Simplex	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
65-69% Cr, 4-9% C		2.00% C	32.75
62-66% Cr, 4-6% C, 6-9% Si			24.75
			25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	$1.18
0.50% max. C	1.14
9 to 11% C	1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.16
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%; Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:

Producing Point	Cents per-lb
Marrietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.00
Clairton, Pa.	10.00
Sheridan, Pa.	10.00
Philo, Ohio	10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.05

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	13.80
50% Si	10.80	85% Si	15.55
65% Si	12.20	90.55% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.18

Ferrocolumbium, 50-60%, 2 in.

x D contract basis, delivered per pound contained Cb.

Ton lots	$3.50
Less ton lots	3.65

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta... $4.75

Ferromolybdenum, 55-75%, f.o.b.

Langleoth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electric, 23-

26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down,

packed, per pound contained W. ton lots, f.o.b. $3.90

Molybdic oxide, briquets or cans,

per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20%Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86-89%

V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20

Zirconium, contract basis, per lb

of alloy

35-40%, f.o.b., freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3¼%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corboriam, Ti 15-21%, B 1-3% Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.95
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	65¢
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.45
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.00

Silcaz, Contract basis, delivered
Ton lots ..... 45.00¢

DYKEM STEEL BLUE

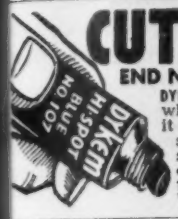
Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303G North 11th St. • St. Louis 6, Mo.

CUT SCRAPER TIME
END NIGHT CLEANUP & MORNING REBLUING



DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

STEEL TUBING
SEAMLESS or WELDED
AIRCRAFT • MECHANICAL
PRESSURE • STAINLESS
STAINLESS PIPE & FITTINGS
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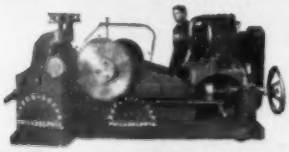

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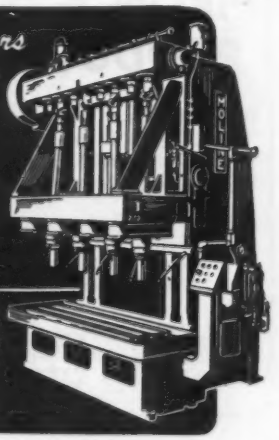

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News of Used and Rebuilt Machinery

Looking Up . . . Coming up: Some kind of business advance. That's the consensus of opinion in the Midwest and it's been borne out by at least some sales advances in the past 30 days. This is no runaway. The advances, where they occur, have not been great and no rash of inventory building has begun as a result. But there is a psychological improvement.

About five weeks ago it appeared that August and July would both run slowly, that used machine tools would, like steel, feel an inordinately deep slump during the industrial vacation period. But with August winding up it appears that August turned out better than many had anticipated (some fairly good rebuilding orders, some sheet metal equipment activity, going sales of small general purpose equipment) and September seems geared for the same kind of improvement.

From this it would appear that the main vacation slump was felt in July, and had run its course before it could strongly affect August buying. Another factor: Some new orders for production equipment in the heavy equipment category brought up dollar volume.

Keep Stocks High . . . For instance: During August, some customers were being lost because the seller didn't have the equipment they wanted for immediate delivery. They went two doors down the street and got it. Another harrassed dealer, when contacted by THE IRON AGE, had two offers for the same piece of equipment, which had been on his floor without a nibble since the beginning of the year.

Said one veteran seller: "After all, I think about 90 pct of this business is knowing when to buy, and the other 10 pct is selling at the right time. We're buying. Not because of the sales pickup we've had in the past 30 days. We just think it's a good time to buy."

Which boiled down to the fact that with a minor increase in sales, he was purchasing used equipment for resale at about the same rate he was buying 30 days ago, when many midwestern dealers were allowing their stocks to sink in anticipation of a long and tough autumn. Everybody is doing some buying, most dealers are at least checking to see what's going on at the auctions, but they still haven't increased their purchases to the point where there will be any kind of inventory buildup.

Which suggests that any business upturn, where it exists, isn't boosting turnover strongly. It's still a good time, many dealers believe, to play your cards close to the chest.

Sheet Forming Good . . . Rebuilding is firm at present. The July lull in sales of light equipment appears to be correcting itself. Sheet metal forming equipment has been good most of the year, particularly so because of the strong home building market in the Midwest. With farm equipment and automotive parts finally moving in some production equipment, the mild August increase is pretty well accounted for.

An unexpected out has been the television industry which has indicated an interest in more sheet forming equipment in the past two months. And welding equipment, a very dark horse through the first half, is beginning to breathe more freely.

Push Up Totals . . . For the industry in the Midwest generally, July-August sales figures, when finally tabulated, may be surprising. One dealer reports a higher dollar volume in August than at any time this year. Another reports July as one of his high months. Another reports a gradual pickup since June. All three handle heavy equipment extensively, say first quarter was worst.